



Palmeraie

Traffic Impact and Mitigation Analysis

Southwest Corner of Scottsdale Road
and Indian Bend Road
Scottsdale, AZ

August 2020
Project No. 15-363

Prepared For:
Five Star Development
6720 North Scottsdale Road
Suite 130
Scottsdale, Arizona 85253

For Submittal to:
City of Scottsdale

Prepared By:



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PALMERAIE MASTER TRAFFIC IMPACT AND MITIGATION ANALYSIS

**Southwest Corner of Scottsdale Road and Indian Bend Road
in Scottsdale, Arizona**

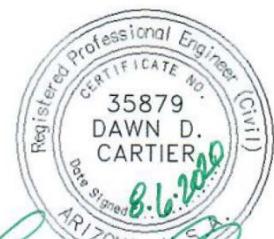
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EXECUTIVE SUMMARY

This report documents a traffic impact analysis performed for a mixed use development consisting of residential, commercial, hotel and office land uses. The proposed Palmeraie development is located on ± 17 acres on the southwest corner of Scottsdale Road and Indian Bend Road. The adjacent Ritz Carlton development within the City of Scottsdale limits is located on ± 105.9 acres north of Lincoln Drive, south of Indian Bend Road, east of Mockingbird Lane and west of Scottsdale Road. The adjacent Parcel E will contain land uses complimentary to Palmeraie and will be available for guests and residents within the Ritz Carlton development.

Palmeraie will be completed in two phases. After the completion of Phase 1, Palmeraie will provide approximately 120,015 square feet (sf) of retail space, 48,055 sf of food and beverage space and 97,300 sf of office space. After the completion of Phase 2, Palmeraie will provide a total of 162,396 sf of retail space, 67,355 sf of food and beverage space, 145,237 sf of office space, approximately 41 multi-family dwelling units and a 150-key hotel.

The site may be accessed directly from Indian Bend Road at a new roundabout providing full access and at a proposed right-in/right-out driveway on Scottsdale Road nearly midway between Indian Bend Road and 6750 North/Spectrum Drive. The site may also be accessed indirectly through Indian Bend Road via Ritz Carlton Boulevard and through Scottsdale Road via 6750 North/Spectrum Drive. The site was designed to provide cross access with the Ritz Carlton development allowing additional points of access to Lincoln Drive at Quail Run Road.

CivTech Inc. has been retained by Five Star Development to perform the traffic impact and mitigation analysis (TIMA) for the proposed development. Palmeraie was previously approved for a mixed use plan in 2016 including office, restaurant, condominiums, and mixed retail. This report represents the first submittal of the updated site plan proposed by the developer.

The following conclusions have been documented in this study:

GENERAL

- The proposed development, once fully constructed, is anticipated to generate 15,440 weekday daily trips, 936 trips during the AM peak hour, and 1,383 trips during the PM peak hour, and 1,802 trips during a Saturday mid-day peak hour.

EXISTING

- The results of the existing analyses indicate that all signalized intersections operate overall at LOS C or better, although most study intersections on Scottsdale Road have one or more movements that operate at LOS E or F during the AM, PM and/or Saturday peak hours.
 - The southbound left and westbound shared movements at the intersections of *Scottsdale Road and Joshua Tree Lane* and *Scottsdale Road and Tuckey Lane* experience elevated delays during the PM and Saturday peak hours. Elevated delay at stop controlled movements at intersections with major roadways is not uncommon.

- Discussions with residents indicate that gaps are created for cross traffic as some drivers allow turning movements to occur during congestion when the 6750 North/Spectrum Drive signal is red for Scottsdale Road traffic and northbound traffic backs up. Traffic signal timing adjustments required to facilitate additional vehicles using 6750 North/Spectrum Drive should create a longer interval for gaps, helping the residents on Joshua Tree Lane and Tuckey Lane ingress and egress their neighborhoods.
- CivTech recommends that the city post a sign indicating "DO NOT BLOCK INTERSECTION" and consider cross-hatch pavement markings.

OPENING YEAR 2023

- The results of the future analyses indicate that all signalized intersections are anticipated to operate overall at LOS D or better except the intersection of Scottsdale Road and Lincoln Drive. Some of the intersections on Scottsdale Road have one or more movement that operate with LOS E or F during the AM, PM or Saturday peak hours.
 - The southbound left and westbound shared movements at the intersections of **Scottsdale Road and Joshua Tree Lane** and **Scottsdale Road and Tuckey Lane** are anticipated to experience elevated delay during the 2023 opening year.
 - Discussions with residents indicates that gaps are created for cross traffic as some drivers allow turning movements to occur during congestion when the 6750 North/Spectrum Drive signal is red for Scottsdale Road traffic and northbound traffic backs up.
 - Traffic signal timing adjustments required to facilitate additional vehicles using 6750 North/Spectrum Drive should create a longer interval for gaps, helping the residents on Joshua Tree Lane and Tuckey Lane ingress and egress their neighborhoods.
 - CivTech recommends that the city post a sign indicating "DO NOT BLOCK INTERSECTION" and consider cross-hatching pavement markings.
 - The intersection of **Scottsdale Road and Indian Bend Road** is expected to operate at LOS C overall during the AM peak hour and operate at LOS D during the PM and Saturday peak hours. Some of the individual movements or approaches are anticipated to operate with poor levels of service, however, with signal timing adjustments, many of those delays are anticipated to be mitigated.
 - The intersection of **Scottsdale Road and 6750 North/Spectrum Drive** is expected to operate at LOS A overall during the AM peak hour, LOS B overall during the PM peak hour and LOS A overall during the Saturday peak hour. These levels of service were achieved with the addition of a second northbound left turn lane at this location. This turn lane is recommended to be constructed along with the Palmeraie

development to facilitate northbound left turn vehicles which could queue back into the through lane blocking traffic. The need for the additional northbound left turn lane can be monitored as building continues at Palmeraie to further evaluate traffic patterns as they develop.

- The intersection of ***Scottsdale Road and Lincoln Drive*** is expected to operate at LOS D overall during the AM peak hour, LOS E overall during the PM peak hour and LOS D overall during the Saturday peak hour. With signal timing adjustments, the overall intersection and some individual movements are expected to operate at LOS E during the peak hours. This is largely due to the relatively high eastbound left turn volumes. The intersection will benefit from adjustments to signal phase splits.
- The eastbound right turn movement at the intersection of ***Scottsdale Road and Street B*** is anticipated to operate at LOS E during the PM peak hour. The projected 95th percentile queue length discussed in a later section is 85 feet, which is less than the available on-site storage prior to an intersection. The characteristics of the driveway also allows a faster egress speed which may increase its efficiency and decrease delay.

QUEUE STORAGE

- The intersection of Scottsdale Road and Indian Bend Road currently provides a single left turn lane on the northbound approach. However, with the anticipated increase in traffic at this location, it is recommended that the area currently striped out on the northbound approach be re-striped to a second northbound left turn lane of the same length as the first, 235 feet.
- At the intersection of Scottsdale Road and 6750 North/Spectrum Drive, a single northbound left turn lane currently exists. It is recommended that by the full buildout condition of Palmeraie, dual northbound left turn lanes be constructed at this location. With dual turn lanes, both lanes could be 100 feet in length and provide sufficient storage for vehicles turning north to west. A total of 190 feet is required which exceeds the length provided by a single lane.
- The new southbound right turn lane on Scottsdale Road approaching Street B is recommended to be constructed with a minimum of 100 feet of queue storage.

SIGHT DISTANCE

- There are no existing obstructions to sight distance within the project intersections or along the included corners of the existing intersections. Adequate sight distance must be provided at the intersections to allow safe left and right turning movements from the development. Recommended distances for these movements can be found in the **Table 10**.

INTRODUCTION

The proposed Palmeraie development is located on ± 17 acres on the southwest corner of Scottsdale Road and Indian Bend Road. The adjacent Ritz Carlton development within the City of Scottsdale limits is located on ± 105.9 acres north of Lincoln Drive, south of Indian Bend Road, east of Mockingbird Lane and west of Scottsdale Road. The adjacent Parcel E will contain land uses complimentary to Palmeraie and will be available for guests and residents within the Ritz Carlton development.

Palmeraie will be completed in two phases. After the completion of Phase 1, Palmeraie will provide approximately 120,015 square feet (sf) of retail space, 48,055 sf of food and beverage space and 97,300 sf of office space. After the completion of Phase 2, Palmeraie will provide a total of 162,396 sf of retail space, 67,355 sf of food and beverage space, 145,237 sf of office space, approximately 41 multi-family dwelling units and a 150-key hotel.

The site may be accessed directly from Indian Bend Road at a new roundabout providing full access and at a proposed right-in/right-out driveway on Scottsdale Road nearly midway between Indian Bend Road and 6750 North/Spectrum Drive. The site may also be accessed indirectly through Indian Bend Road via Ritz Carlton Boulevard and through Scottsdale Road via 6750 North/Spectrum Drive. The site was designed to provide cross access with the Ritz Carlton development allowing additional points of access to Lincoln Drive at Quail Run Road. A vicinity of the site is included in **Figure 1**.

STUDY REQUIREMENTS

This study analyzes the traffic impact due to the proposed development on the surrounding street network. The study will be prepared in conformance with the City of Scottsdale *Design Standards and Policies Manual*, Chapter 5, Transportation Impact Studies, 2018. The specific objectives of the study are:

- To determine the existing site generated trips through trip generation rate calculations.
- To determine whether the planned street system in the vicinity of the site is adequate to accommodate the increased traffic that results from the proposed development.
- To recommend additional street improvements or traffic control devices, where necessary, to mitigate the additional site-generated traffic; and,
- Evaluate the internal site circulation, site access points, and provide recommendations if necessary.

STUDY AREA

The study area has been defined as including the following intersections:

- Scottsdale Plaza Resort & Indian Bend Rd
- Scottsdale Rd & Indian Bend Rd
- Scottsdale Rd & Joshua Tree Ln
- Scottsdale Rd & 6750 North

- Quail Run Rd & Lincoln Drive
- Scottsdale Rd & Tuckey Ln
- Scottsdale Rd & Lincoln Dr

HORIZON YEARS

CivTech Inc. spoke to City Staff on Tuesday, March 17, 2020 and it was decided that due to the abnormal traffic conditions in the study area at this time, the existing and horizon years from the previous version of the TIMA, completed in September of 2016, will be utilized for this study. For the purposes of this study the existing year will be 2016 and the opening year/full buildout year will be 2023. Although this is a multi-phase development, an intermediate horizon year is not being analyzed at request of City of Scottsdale Staff. The previous TIMA from 2016 shows the multi-phase analysis, however, due to the unusual circumstances of the COVID-19 outbreak, it has been indicated to CivTech that an intermediate horizon year is not necessary in the updated analysis of the Palmeraie development.

The study intersections and the site accesses will be analyzed for the AM and PM peak hours to determine the recommended intersection lane configuration, intersection stop control, turn lane storage requirements, and roadway typical sections for the development.

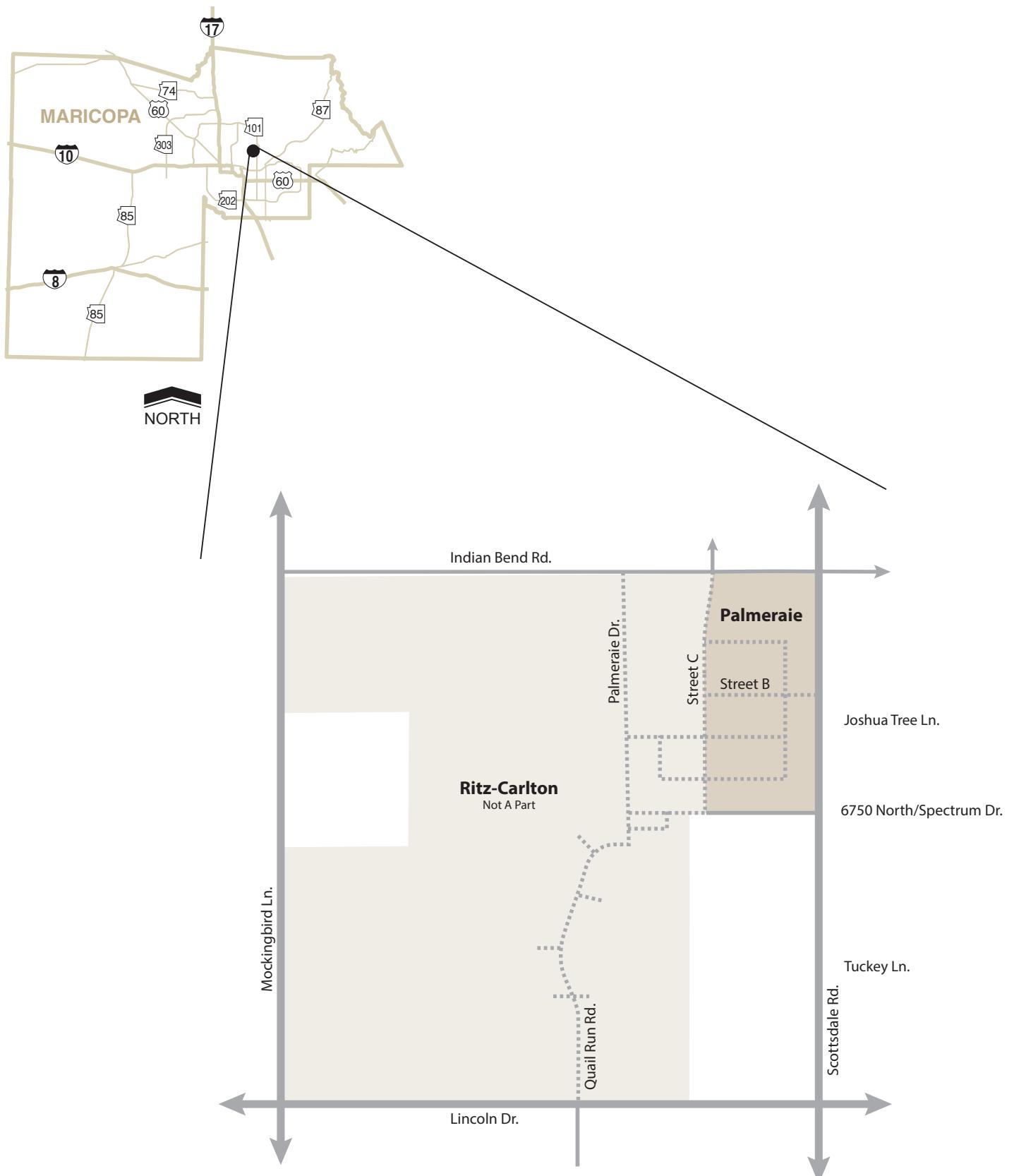


Figure I: Vicinity Map

Source: CivTech, Inc. 2020

EXISTING CONDITIONS

SURROUNDING LAND USE

The Palmerae site is currently undeveloped land located in the City of Scottsdale. Scottsdale Road serves as the primary boundary between the City of Scottsdale and the Town of Paradise Valley. However, the boundary jogs to the west at Indian Bend Road and aligns with 71st Street (approximately) and serves as the western border of the site. Land between 71st Street, Scottsdale Road, Indian Bend Road and Lincoln Drive is located within the City of Scottsdale.

The existing Spectrum Office development is located to the south of the site. It consists of a campus of office buildings with underground parking. A signalized driveway providing access to Scottsdale Road was provided with cross access granted to the Ritz Carlton and Palmerae developments. A half street configuration, acting as a site driveway, is currently provided for the Spectrum Office Complex use.

The Scottsdale Plaza Resort is located directly north of Indian Bend Road and is accessed via one driveway to Scottsdale Road, one driveway to Indian Bend Road and one driveway to Hummingbird Lane. The access along Indian Bend Road is just east of the Scottsdale city border alignment.

A mixed commercial, and multifamily complex is located on the northeast corner of the intersection of Scottsdale Road and Indian School Road. The McCormick-Stillman Railroad Park is located east of Scottsdale Road on the southeast corner of Indian Bend Road and Scottsdale Road serves as a regional park for the City of Scottsdale. Multi-family residence complexes are located east and southeast of the site

The Ritz Carlton is a planned development within the Town of Paradise Valley and is located to the west and southwest of the site. The Ritz Carlton is within the process of receiving approval by the town's high counsel, but is anticipated to be approved by the time this updated Palmerae development is approved by the City of Scottsdale.

EXISTING ROADWAY NETWORK

The existing roadway network includes the following streets. All roadway classifications were determined using the City of Scottsdale Street Classification Map

Scottsdale Road is a north-south roadway located in the City of Scottsdale. Within the study area, Scottsdale Road is classified as a major arterial - suburban and has a posted speed limit along Scottsdale Road of 45 miles per hour (mph). Scottsdale Road provides access to the Carefree Highway (SR 74), the Pima Freeway (Loop 101), and the Red Mountain Freeway (Loop 202). Beginning in the north, Tom Darlington Drive becomes Scottsdale Road upon crossing Carefree Highway. South of the project and south of Red Mountain Freeway, Scottsdale Road eventually becoming Rural Road.

Indian Bend Road is an east-west roadway. West of Scottsdale Road, it is located in the Town of Paradise Valley, is classified as a collector and has a posted speed limit of 25 mph. East of Scottsdale Road, Indian Bend Road is fully within the City of Scottsdale and is classified as a suburban minor

arterial. The posted speed limit along Indian Bend Road, east of Scottsdale Road, is 40 mph. Beginning in the east at Pima Freeway (Loop 101), Indian Bend Road continues west until terminating at Mockingbird Lane. Indian Bend Road provides regional access to the Pima Freeway. The original traffic circle constructed along Indian Bend Road has already been removed as part of the Ritz Carlton development within the Town of Paradise Valley.

Lincoln Drive is an east-west roadway. East of the 71st Street alignment, it is within the City of Scottsdale, is classified as a minor collector - suburban and has a posted speed limit of 35 mph. West of the 71st Street alignment, it is located in the Town of Paradise Valley, is classified as a urban major arterial and has a posted speed limit of 40 mph. Beginning in the east at Cattletrack Road, Lincoln Drive continues west, providing access to the Piestewa Peak Highway (SR 51). After crossing the SR 51, the alignment becomes Glendale Avenue where it continues to the west providing access to I-17.

6750 North/Spectrum Drive is an east-west driveway located in the City of Scottsdale. It is located on Scottsdale Road approximately ¼-mile north of the Scottsdale Road and Lincoln Drive intersection. This access currently operates as a driveway for Spectrum. The existing configuration of the driveway provides for the half street on the south side (Spectrum property).

EXISTING INTERSECTION CONFIGURATION

The intersection of **Scottsdale Plaza Resort Driveway and Indian Bend Road** is operating as a tee intersection under stop controlled conditions for the southbound approach. All approaches consist of a single general purpose lane. Indian Bend Road functions as the major roadway, while the Scottsdale Plaza Resort Driveway functions as the minor roadway.

The intersection of **Scottsdale Road and Indian Bend Road** is operating under signalized conditions. The north- and southbound left-turn movements operate with permitted and lagging protective phasing. The east- and westbound approaches are split phase lagging and leading, respectively. The northbound approach consists of one dedicated left turn lane, three through lanes, and one dedicated right turn lane. In 2016, the southbound approach consisted of one dedicated left turn lane, two through lanes, and one shared through-right turn lane; however, by 2020 a second southbound left turn lane had been constructed. The existing conditions analysis includes the 2016 lane configuration representing the condition at the time traffic counts were conducted. The eastbound approach consists of one dedicated left turn lane and a shared through-right turn lane. The westbound approach consists of two dedicated left turn lanes, one through lane, and one shared through-right turn lane.

The intersection of **Scottsdale Road and Joshua Tree Lane** is operating as a tee intersection under stop controlled conditions for the westbound approach. The northbound approach consists of two through lanes and a shared through-right turn lane. The southbound approach consists of a dedicated left turn lane and three through lanes. The westbound approach consists of a single general purpose lane. The intersection provides a center vehicle refuge space for left turning vehicles from Joshua Tree Lane. Scottsdale Road functions as the major roadway, while the Joshua Tree Lane functions as the minor roadway.

The intersection of ***Scottsdale Road and 6750 North/Spectrum Drive*** is operating as a tee intersection under signalized conditions. The Spectrum access is located on Scottsdale Road between Lincoln Drive and McDonald Drive at $\frac{1}{4}$ mile spacing. All left turn movements operate with permitted phasing. The northbound approach consists of one dedicated left turn lane and three through lanes. The southbound approach consists of three through lanes and one dedicated right turn lane. The eastbound approach consists of one dedicated left turn lane and one dedicated right turn lane. There is no westbound approach.

The intersection of ***Scottsdale Road and Tuckey Lane*** is operating as a tee intersection under stop controlled conditions for the westbound approach. The northbound approach consists of two through lanes and a shared through-right turn lane. The southbound approach consists of a dedicated left turn lane and three through lanes. The westbound approach consists of a single general purpose lane. The intersection provides a center vehicle refuge space for left turning vehicles from Tuckey Lane. Scottsdale Road functions as the major roadway, while the Tuckey Lane functions as the minor roadway.

The intersection of ***Quail Run Road and Lincoln Drive*** is operating as a tee intersection under stop controlled conditions for the northbound approach. The northbound approach consists of a single general purpose lane. The eastbound approach consists of one through lane and a shared through-right turn lane. The westbound approach consists of one dedicated left turn lane and two through lanes.

The intersection of ***Scottsdale Road and Lincoln Drive*** is operating under signalized conditions. The northbound and southbound left-turn movements operate with lagging protective phasing. The east- and westbound approaches are split phase lagging and leading, respectively. The south- and eastbound right-turn movements have an additional protected phase during the eastbound approach and northbound left-turn protected phases, respectively. The northbound approach consists of two dedicated left turn lanes, two through lanes, and a shared through-right turn lane. The southbound approach consists of one dedicated left turn lane, three through lanes and a right turn lane. The eastbound approach consists of one dedicated left turn lane, one shared through-left turn lane, and one right turn lane. The westbound approach consists of one dedicated left turn lane, one through lane, and one shared through-right turn lane.

The existing intersection traffic controls are summarized in **Table 1**. The existing intersection lane configurations and traffic control is illustrated in **Figure 2**.

Table 1 – Existing Intersection Traffic Controls

Intersection	Traffic Controls
Scottsdale Plaza Resort & Indian Bend Rd.	1-way stop (SB)
Scottsdale Rd. & Indian Bend Rd.	Signalized
Scottsdale Rd. & Joshua Tree Ln.	1-way stop (WB)
Scottsdale Rd. & 6750 North	Signalized
Scottsdale Rd. & Tuckey Ln.	1-way stop (WB)
Quail Run Rd. & Lincoln Dr.	1-way stop (NB)
Scottsdale Rd. & Lincoln Dr.	Signalized

EXISTING TRAFFIC VOLUMES

CivTech engaged Field Data Services of Arizona, Inc. to record traffic volumes at seven (7) study intersections within the project vicinity. Peak hour volume turning movement counts were performed from 7:00-9:00 AM and 4:00-6:00 PM on Tuesday, May 14, 2015. Peak hour turning movement counts were conducted at the following study intersections:

- Scottsdale Plaza Resort & Indian Bend Rd
- Scottsdale Rd & Joshua Tree Ln
- Quail Run Rd & Lincoln Drive
- Scottsdale Rd & Tuckey Ln
- Scottsdale Rd & Indian Bend Rd
- Scottsdale Rd & 6750 North/Spectrum Drive
- Scottsdale Rd & Lincoln Dr

This study has, for the most part, been conducted to conform to City of Scottsdale *Design Standards and Policies Manual*, Chapter 5, Transportation Impact Studies, 2018. However, due to special circumstances (e.g. the novel Coronavirus or COVID-19) some exceptions were granted by City Staff in conducting this TIMA update. On March 15, 2020 the Governor of Arizona announced that schools will temporarily be closed because of the virus. Additionally, the National Government has recommended that anyone who has the ability to should work from home, meaning that the traffic conditions at the time this update was completed were abnormal and not representative of typical traffic in the area. It would also be difficult to apply a growth factor to the counts because it could not be determined how many businesses in the area had shut down at the time or how many people had decided to work at home.

CivTech Inc. spoke with City Staff on Tuesday, March 17, 2020 and it was decided that due to the abnormal traffic conditions in the study area at this time, the traffic counts from the last Palmeraie study, conducted on Tuesday May 14, 2015, will be used as existing counts for this updated TIMA.

The existing traffic volumes observed for this study are presented in **Figure 3** for the weekday AM and PM peak hours. Traffic volume data obtained for this study have been included in **Appendix B**.

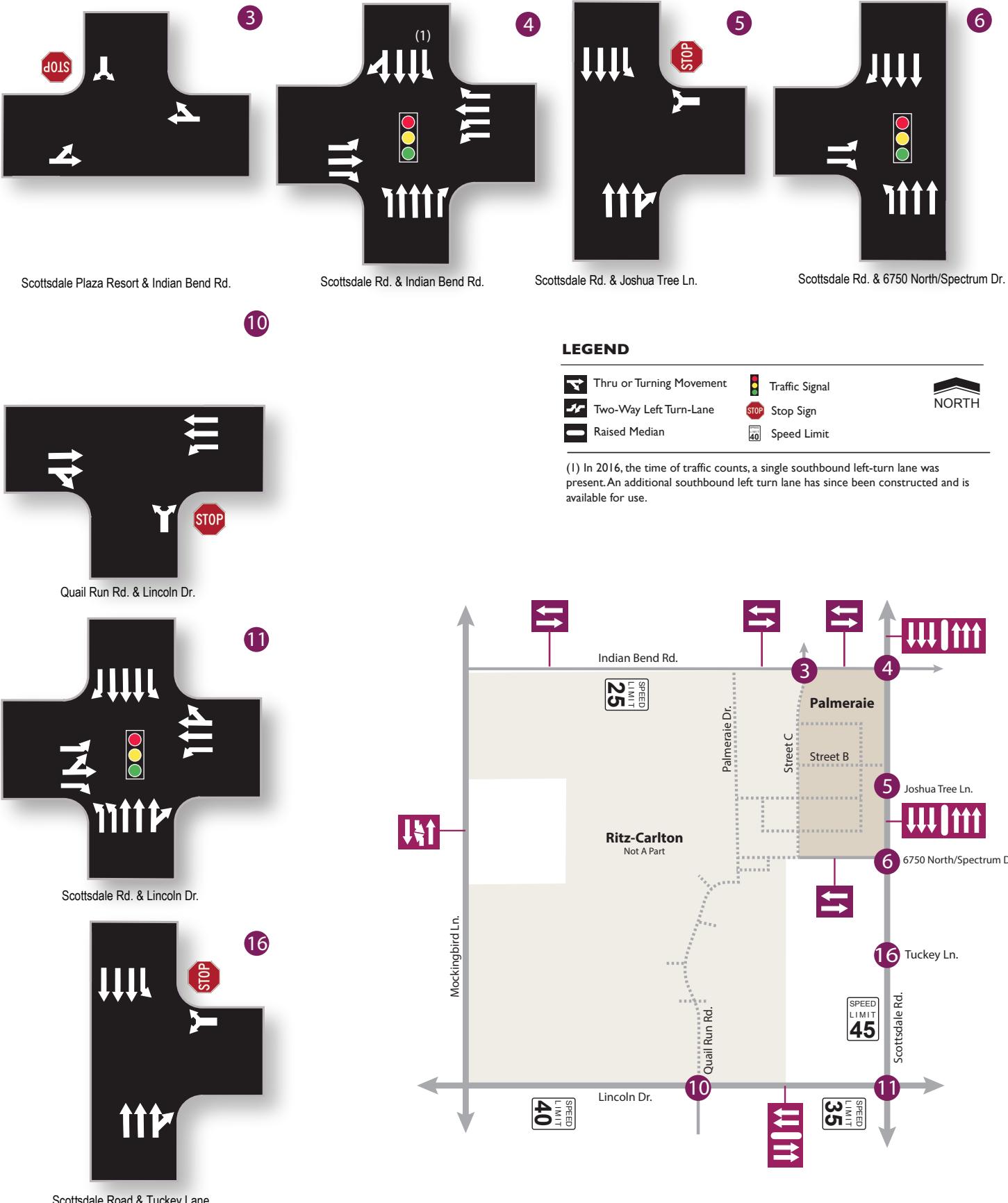
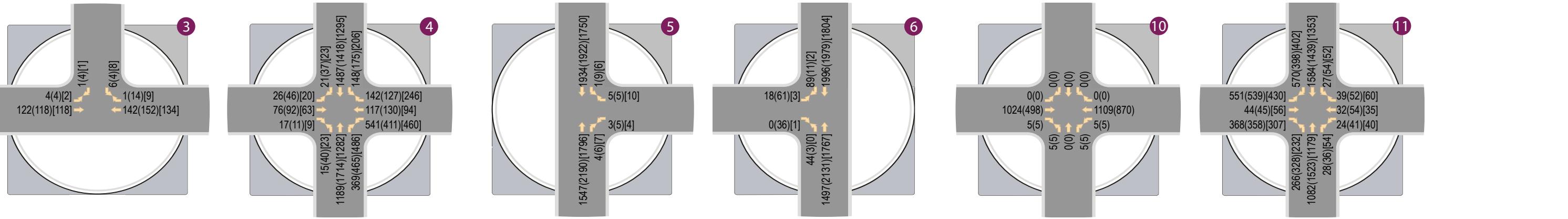


Figure 2: Existing Lane Configurations and Traffic Controls

Source: CivTech, Inc. 2020



Scottsdale Plaza Resort & Indian Bend Rd.

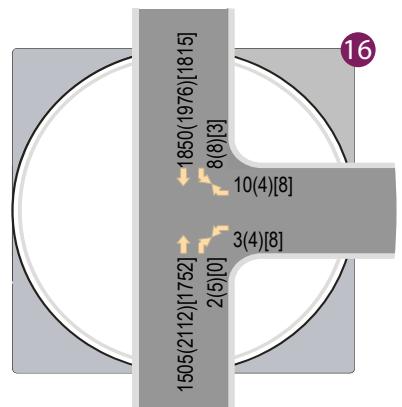
Scottsdale Rd. & Indian Bend Rd.

Scottsdale Rd. & Joshua Tree Ln.

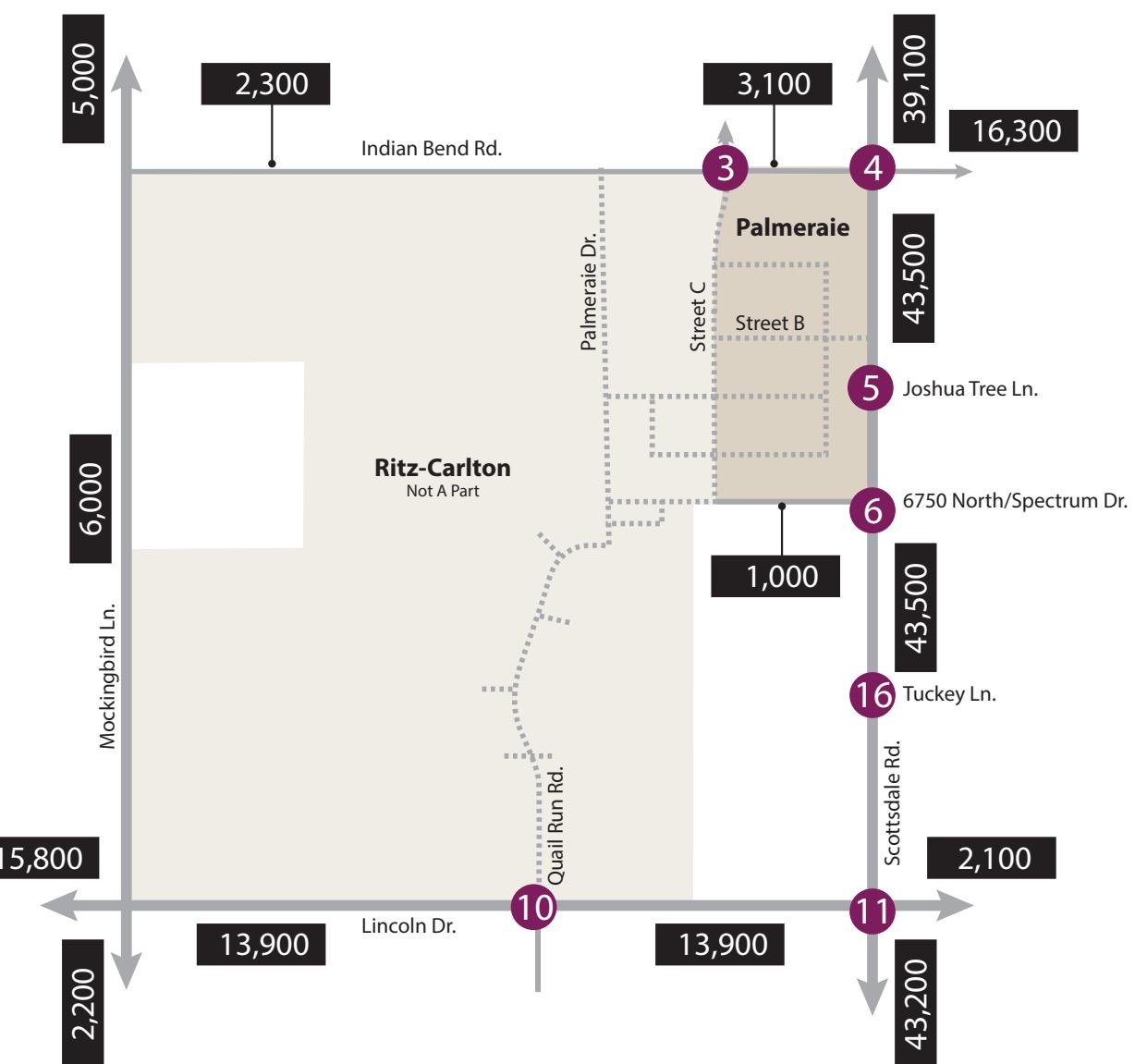
Scottsdale Rd. & 6750 North

Quail Run Rd & Lincoln Dr.

Scottsdale Rd. & Lincoln Dr.



Scottsdale Rd. & Tuckey Ln.

**LEGEND**

XX(XX)[XX] - AM(PM)[Sat] Peak Hour Traffic Volumes
XX,XXX - Average Daily Traffic Volumes

**Figure 3:** Existing Traffic Volumes

Source: CivTech, Inc. 2020

EXISTING CAPACITY ANALYSIS

Peak hour capacity analyses have been conducted for the study intersections based on existing intersection configurations and traffic volumes. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM)*, *Special Report 209*, and Updated 2016 and using Synchro software, version 10.0 under the HCM 6th edition methodology.

The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. Levels of service for intersections are defined in terms of delay ranges. **Table 2** lists the level of service criteria for signalized and unsignalized intersections, respectively.

Table 2 – Level of Service Criteria for Controlled Intersections

Level-of-Service	Signalized Control Delay (sec/veh)	Unsignalized Control Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80 (or v/c > 1)	> 50 (or v/c > 1)

Source: Exhibits 19-8, 20-2, 21-8, and 22-8, Highway Capacity Manual 2017

Synchro 10.0 software calculates the LOS per the HCM 2016 methodology. The 2016 HCM documents the signalized LOS calculation methodology which takes into account lane geometry, traffic volumes and cycle length/phasing to compute LOS. Synchro analysis worksheets report individual movement delay/LOS and overall delay/LOS for signalized intersections; unsignalized intersection worksheets report the worst-case delay/LOS and the average overall intersection delay. Results of the existing level of service analyses are shown in **Table 3** for both AM and PM peak hours. The existing conditions analysis worksheets have been included in Appendix C.

Table 3 – Existing Peak Hour Levels of Service

ID	Intersection	Intersection Control	Approach/Movement	Existing LOS	
				AM(PM)[SAT]	
3	Scottsdale Plaza Resort Driveway & Indian Bend Rd.	1-way stop (SB)	SB shared EB shared	A(A)[B] A(A)[A]	
4	Scottsdale Rd. & Indian Bend Rd.	Signalized	NB left	C(C)[C]	
			NB thru	A(B)[A]	
			NB right	A(A)[A]	
			SB left	C(D)[D]	
			SB thru	C(C)[C]	
			SB right	D(C)[C]	
			EB left	E(E)[D]	
			EB thru	E(E)[D]	
			EB right	D(D)[D]	
			WB left	E(E)[D]	
			WB thru	D(D)[C]	
			WB right	B(B)[B]	
			Overall	C(C)[B]	
5	Scottsdale Rd. & Joshua Tree Ln.	1-way stop (WB)	SB left WB shared	D(F)[D] D(F)[E]	
6	Scottsdale Rd. & 6750 North/Spectrum Drive	Signalized	NB left	B(A)[A]	
			NB thru	B(A)[A]	
			SB thru	A(A)[A]	
			SB right	A(A)[A]	
			EB left	E(E)[D]	
			EB right	-E(D)[D]	
			Overall	A(A)[A]	
10	Quail Run Rd. & Lincoln Dr.	1-way stop (NB)	NB shared WB left	D(C) B(A)	
11	Scottsdale Rd. & Lincoln Dr.	Signalized	NB left	D(D)[D]	
			NB thru	C(C)[C]	
			NB right	C(D)[C]	
			SB left	D(D)[D]	
			SB thru	D(E)[C]	
			SB right	E(D)[C]	
			EB left/thru	F(F)[D]	
			EB right	D(D)[D]	
			WB left	E(D)[D]	
			WB thru	E(D)[D]	
			WB right	E(D)[D]	
			Overall	D(D)[C]	
16	Scottsdale Rd. & Tuckey Ln.	1-way stop (WB)	SB left WB shared	D(F)[D] C(F)[F]	

The results of the existing analyses indicate that all signalized intersections operate overall at LOS C or better, although most study intersections on Scottsdale Road have one or more movements that operate at LOS E or F during the AM, PM and/or Saturday peak hours.

The southbound left and westbound shared movements at the intersections of ***Scottsdale Road and Joshua Tree Lane*** and ***Scottsdale Road and Tuckey Lane*** experience elevated delays during the peak hours. Elevated delay at stop controlled movements at intersections with major roadways is not uncommon. Discussions with residents indicate that gaps are created for cross traffic as some drivers allow turning movements to occur during congestion when the 6750 North/Spectrum Drive signal is red for Scottsdale Road traffic and northbound traffic backs up. Additional vehicles to the 6750 driveway should create a longer interval for gaps, helping the residents on Joshua Tree Road and Tuckey Lane ingress and egress their neighborhoods. CivTech recommends that the city post a sign indicating "DO NOT BLOCK INTERSECTION" and consider cross-hatch pavement markings.

FUTURE ROADWAY IMPROVEMENTS

PROJECT SPECIFIC IMPROVEMENTS

Indian Bend Road along the site frontage is currently paved on the north half of the street. After a series of communications between the developer, the City of Scottsdale and the Town of Paradise Valley, it is proposed to modify Indian Bend Road to add a roundabout at the entrance to Palmeraie. The design is to encourage access to Palmeraie via Indian Bend Road while allowing traffic to flow freely along Indian Bend Road while slowing to negotiate the roundabout. Indian Bend Road will tie into the west leg of its intersection with Scottsdale Road with 2 travel lanes in each direction and an eastbound left turn lane. Near the beginning of the curve, Indian Bend Road will begin a transition towards a 2-lane roadway. Indian Bend Road east of the roundabout will provide 1 travel lane in each direction, maintain its connection to the Scottsdale Plaza Resort driveway and slightly curve southwards before teeing into the Street C/Indian Bend Road curve. The developer is responsible for half street improvements on the south side of Indian Bend Road along the frontage of the site, as well as any changes required with the proposed modifications.

The City of Scottsdale has previously indicated that the development may be required to add a southbound approaching right turn lane at the intersection of Scottsdale Road and Indian Bend Road. This modification will require the relocation of a signal pole on the modified corner. The north- and southbound approaching left turn lanes will be modified to provide dual turn lanes.

The north half of 6750 North/Spectrum Drive will be constructed along the site frontage and the intersection of Scottsdale Road and 6750 North/Spectrum Drive will be improved. The west leg of the intersection after improvements will consist of two dedicated left turn lanes, a dedicated right turn lane and two ingress lanes. The median within the south leg of the intersection will be modified and the northbound lanes restriped to provide two dedicated left turn lanes and three through lanes. An alternative improvement condition is considered should the City of Scottsdale not allow dual northbound left turn lanes. Final geometry and mitigation is subject to approval by the City of Scottsdale.

RITZ CARLTON SPECIFIC IMPROVEMENTS

The developer plans to signalize the intersection of Quail Run Road and Lincoln Drive and provide a westbound right turn lane, which will serve as the main entrance to the proposed Ritz Carlton Resort by opening year 2018. The eastbound left turn lane on Lincoln Drive approaching the intersection

will require removal of the nearest median (west of the intersection). The developer currently plans to construct improved medians on Lincoln Drive. The developer plans to construct a westbound right turn lane and a southbound right turn lane at the intersection of Mockingbird Lane and Lincoln Drive. The turn lanes will separate approaching right turning traffic from through traffic on the same approach and improve the traffic characteristics of the intersection.

REGIONAL IMPROVEMENTS

Construction along Scottsdale Road, north of the Palmerae development was completed in early 2007 as part of a City of Scottsdale improvement project. Eastbound Indian Bend Road was widened at the intersection with Scottsdale Road to provide dual westbound left turn lanes. The Town of Paradise Valley plans to install a median on Mockingbird Lane between Lincoln Drive and Northern Avenue sometime within the financial years 2018 and 2029. This improvement is not anticipated to cause major changes to current traffic patterns. There are no other known projects planned within the opening years of the Palmerae development which will redirect current traffic patterns on the surrounding area streets.

CRASH HISTORY

The following crash analysis was developed from historical data obtained by CivTech from the City of Scottsdale. The crash data obtained can be found in **Appendix D**. The crash history data covered the latest full three year periods available, 2017 through 2019. For this project, CivTech has included only collisions recorded as intersection related at the study intersections.

There were crashes at or related to three (3) of the six (6) study intersections. At the intersection of Scottsdale Road at 6750 North, and at the intersection of Scottsdale Road and Joshua Tree Lane, no crashes were recorded. The intersection of Scottsdale Road and Tuckey Lane recorded one (1) PDO (Property Damage Only) incident in its 3-year analysis, which does not warrant further evaluation.

Scottsdale Road at Indian Bend Road - The crashes recorded at the signalized intersection of Scottsdale Road and Indian Bend Road are summarized in **Table 4**. Approximately 25 percent (13 of 51) of the crashes resulted in injury. Most of the collisions occurred during daylight in clear weather on dry roads. Only a couple incidents occurred at dusk or in the dark, or raining with wet conditions.

Table 4 – Intersection Crashes: Scottsdale Road at Indian Bend Road

STATISTIC	2017	2018	2019	TOTAL
Crash Severity				
Injury Crashes (# Injuries)	3 (3)	5 (6)	5 (8)	13 (17)
Non-Injury	11	15	12	38
TOTAL	14	20	17	51
Crash Type				
Single Vehicle	1	0	1	2
Angle	3	4	3	10
Rear End	6	11	8	25
Sideswipe (same direction)	3	3	3	9
Head On	1	0	0	1
Left Turn	0	2	2	4
Other/Unknown	0	0	0	0
TOTAL	14	20	17	51
Crashes involving bicycles/pedestrians	0	0	0	0

A review of the crash data reveals that more than 49 percent of the crashes (25 of 51) were rear-end collisions. Rear-end collisions tend to increase when a traffic signal is used to treat the types of collisions that are more severe, such as angle or left turn collisions, and are generally considered untreatable as they are often the result of inattention or some other factor contributed by the driver of the following vehicle.

The largest majority of crashes reported occurred in clear weather on dry roads throughout the year with no concentrations of collisions on any particular day of the week or in any single month or season. Only one incident was recorded for raining conditions and two incidents reported wet surface.

Scottsdale Road at Lincoln Drive - The crashes recorded at the signalized intersection of Scottsdale Road at Lincoln Drive are summarized in **Table 5**. This is a major intersection with a traffic signal. Less than one-third of the crashes (18 of 57) resulted in bodily injury.

Table 5 – Intersection Crashes: Scottsdale Road at Lincoln Drive

STATISTIC	2017	2018	2019	TOTAL
Crash Severity				
Injury Crashes (# Injuries)	6 (7)	7 (7)	5 (5)	18 (19)
Non-Injury	11	13	15	39
TOTAL	17	20	20	57
Crash Type				
Single Vehicle	0	1	2	3
Angle	4	3	4	11
Rear End	8	8	6	22
Sideswipe (same direction)	3	1	4	8
Head On	1	1	0	2
Left Turn	1	4	4	9
Sideswipe (opposite direction)	0	1	0	1
Rear to Side	0	1	0	1
Other/Unknown	0	0	0	0
TOTAL	17	20	20	57
Crashes involving bicycles/pedestrians	0	0	0	0

A review of the results summarized in **Table 5** reveals that the several types of crashes that occurred on Scottsdale Road at Lincoln Drive do not warrant further detailed analysis (contributing factors, etc.) or any mitigation measures that could be provided with the proposed development.

A review of the crash data reveals that less than half (22 of 57) of the crashes were rear-end collisions, which may occur whenever there is a slowing or stopping of traffic, such as for a red light. Rear-end collisions tend to increase when a traffic signal is used to treat the types of collisions that are more severe, such as angle or left turn collisions, and are generally considered untreatable as they are often the result of inattention or some other factor contributed by the driver of the following vehicle.

Scottsdale Road at Tuckey Lane – Only one crash was recorded at the unsignalized intersection of Scottsdale Road at Tuckey Lane. It was a property damage only (PDO) type crash with no injuries and only a single vehicle.

Conclusion. Per the above discussion, it can be concluded that there are no major mitigation measures currently warranted within the vicinity of the site.

PROPOSED DEVELOPMENT

SITE LOCATION

The proposed Palmerae development is located on ± 17 acres on the southwest corner of Scottsdale Road and Indian Bend Road. The related and adjacent Ritz Carlton development within the Town of Paradise Valley is located on ± 106 acres north of Lincoln Drive, south of Indian Bend Road, east of Mockingbird Lane and west of Scottsdale Road.

SITE DENSITY/INTENSITY

This development consists of mixed uses which include retail, restaurant, office, residential and hotel land uses. The approximate amount of each land use consists of 162,396 SF of retail, 67,355 SF of restaurant, 145,237 SF of office, 41 condominiums/townhouses dwelling units and 150 hotel guestrooms.

SITE ACCESS

The site may be accessed directly from Indian Bend Road at a new roundabout providing full access and at a proposed right-in/right-out driveway on Scottsdale Road nearly midway between Indian Bend Road and 6750 North/Spectrum Drive. The site may also be accessed indirectly through Indian Bend Road via Palmerale Drive and through Scottsdale Road via 6750 North/Spectrum Drive. The site was designed to provide cross access with the Ritz Carlton development allowing additional points of access to Lincoln Drive at Quail Run Road.

The proposed site layout is provided in **Figure 4**.

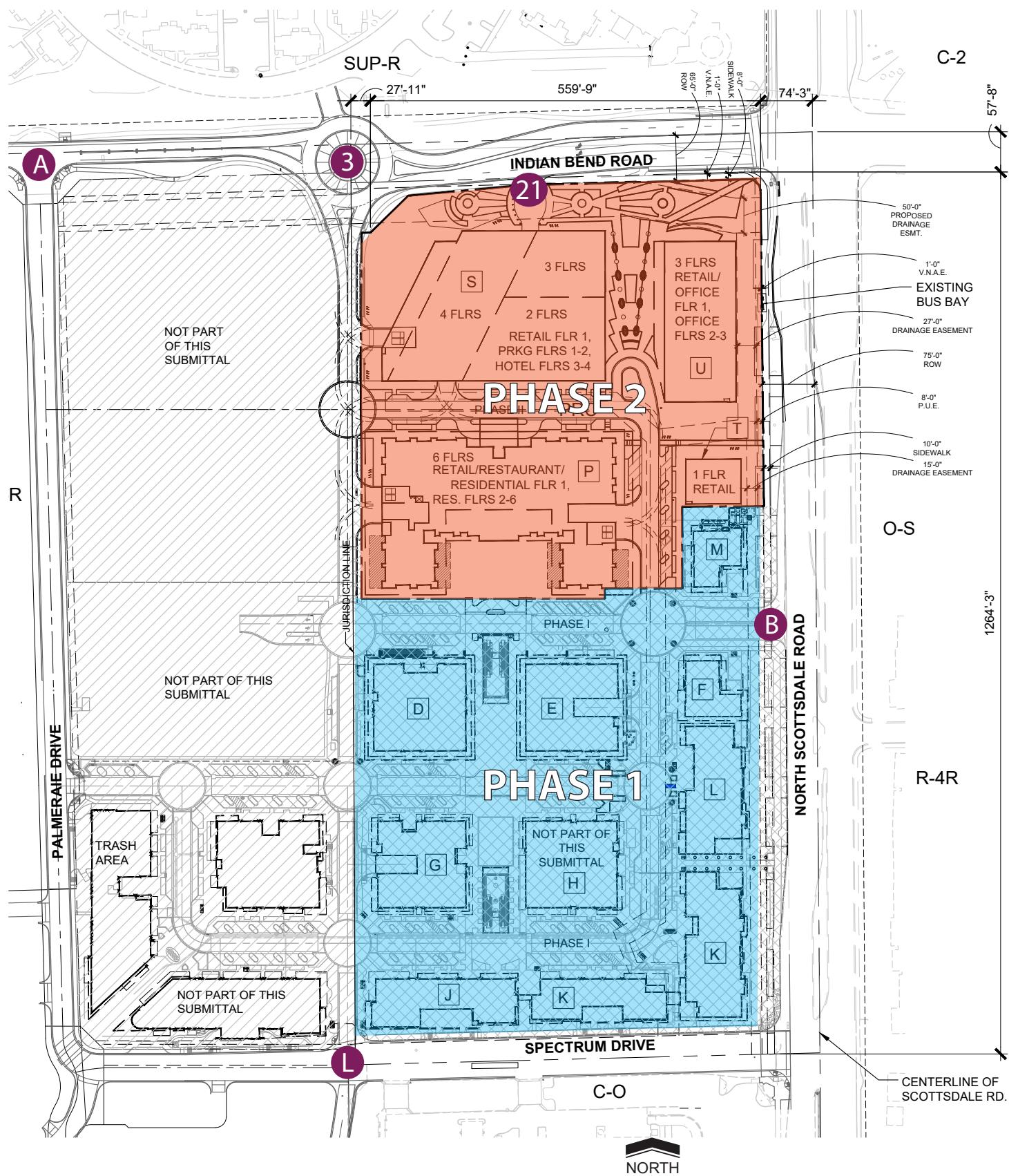


Figure 4: Site Plan and Access

Source: CivTech, Inc. 2020

TRIP GENERATION

The potential trip generation for the proposed development was estimated utilizing the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* and *Trip Generation Handbook, 3^d Edition*. The ITE *Trip Generation Manual* contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the report and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized land use. The report provides information for daily and peak hour trips.

In order to calculate the rates for this development, first the trips generated by the full buildout condition, Phase 1 and Phase 2, were calculated using fitted curves. The full buildout condition of the proposed development will provide approximately 162,396 SF of retail space (LUC 820), 67,355 SF for food and beverage (LUC 932), 145,237 SF of office space (LUC 710), 41 multi-family dwelling units (LUC 221) and a 150-key hotel (LUC 310). These calculated rates were then applied to just the Phase 1 development so that the estimated trips generated are more consistent with actual traffic patterns. For Phase 1, the Palmerae development will provide 120,015 SF of retail space of the overall SF (LUC 820), 48,055 SF of food and beverage of the overall SF (LUC 932) and 97,300 SF of office space of the overall SF (LUC 710).

INTERNAL CAPTURE

According to data presented in the Trip Generation Handbook, 3rd Edition, trips attracted to certain land uses are often shared. This means that a single trip (vehicle) to the proposed development may visit additional attractions within the site during the same visit, an occurrence known as internal capture. This is especially true for large mixed-use developments. An example of this would be a business person, who generated a trip on their drive to and home from work, who walks to the restaurant near their building for lunch. This restaurant trip is not a new vehicle trip on the roadway. Internal capture reductions have the effect of reducing the impact of double counting the same trip on the surrounding roadway network.

Due to the mixture of retail land uses that are proposed within this development, CivTech used an internal capture percentage of 20% for the daily trips as well as both the AM and PM peak hour trips. The Ritz Carlton Traffic Impact Analysis uses a 20% internal capture reduction based on ITE methodology. The internal capture rate applies to the Palmerae development is consistent with the rate used in the previously approved Palmerae TIMA and that utilized in the approved Ritz Carlton Resort TIA.

The anticipated trip generation is summarized in

Table 6. Detailed trip generation calculations are provided in Appendix E.

Table 6 – Trip Generation

Proposed Use	ITE LUC	Size	Units	Weekday Trips							Saturday Trips			
				Daily		AM Peak Hour			PM Peak Hour			Mid-day Peak Hour		
				Total	In	Out	Total	In	Out	Total	In	Out	Total	
Phase 1														
Retail	820	120.015	KSF	6,178	107	65	172	276	299	575	281	259	540	
Food & Beverage	932	48.055	KSF	5,390	263	215	478	291	178	469	285	253	538	
Office	710	97.3	KSF	1,020	94	15	109	17	92	109	28	24	52	
Subtotals				12,588	464	295	759	584	569	1,153	594	536	1,130	
<i>Internal Capture Reduction (20%)</i>				(2,518)	(93)	(59)	(152)	(116)	(115)	(231)	(119)	(107)	(226)	
External Trips				10,070	371	236	607	468	454	922	475	429	904	
Phase 1 + Phase 2														
Retail	820	162.396	KSF	8,360	144	89	233	373	405	778	380	351	731	
Food & Beverage	932	67.355	KSF	7,556	369	301	670	408	250	658	385	369	754	
Office	710	145.237	KSF	1,524	140	23	163	26	136	162	42	35	77	
Apartments	221	41	DU	222	4	10	14	12	7	19	10	8	18	
Hotel	310	150	Rooms	1,266	41	29	70	44	42	86	60	48	108	
Subtotals				18,928	698	452	1,150	863	840	1,703	877	811	1,688	
<i>Internal Capture Reduction (20%)</i>				(3,488)	(131)	(83)	(214)	(162)	(158)	(320)	(194)	(181)	(375)	
External Trips				15,440	567	369	936	701	682	1,383	702	648	1,350	

As summarized in **Table 6**, by completion of Phase 1, the Palmerae development is anticipated to generate approximately 10,070 external weekday daily trips with 607 trips occurring during the AM peak hour (371 in/236 out) and 922 trips occurring during the PM peak hour (468 in/454 out). On Saturdays, typically there is a single peak hour that occurs around mid-day. By completion of Phase 1, the Palmerae development is anticipated to generate approximately 904 Saturday peak trips (475 in/429 out).

By full buildout of the development, or completion of both Phase 1 and Phase 2, the Palmerae development is anticipated to generate approximately 15,440 external weekday daily trips with 936 occurring during the AM peak hour (567 in/369 out) and 1,383 trips occurring during the PM peak hour (701 in/682 out). On a typical Saturday, the Palmerae development is anticipated to generate approximately 1,350 peak hour trips (702 in/648 out).

VEHICLE TRIP DISTRIBUTION AND ASSIGNMENT

The Palmerae development consists of multiple land uses. Trips were distributed based on the type of land use. The trip distributions for all but the hotel distribution were developed in consideration of population and employment within certain distances of the site, as estimated with socioeconomic data projected by Maricopa Association of Government (MAG). For hotel trips external to the site, most were considered to travel to/from Phoenix Sky Harbor Airport or to/from major shopping areas in the vicinity. The distributions remain consistent with the originally approved Palmerae TIMA and are generally similar to what was applied within the Ritz Carlton TIA as the distribution of

socioeconomic data is the same, but the trip distributions are also influenced by major routes and access. The trip distribution applied to site generated traffic is summarized in **Table 7**.

Table 7 – Trip Distribution Percentages by Land Use

Roadway	To/From	Trip Distribution			
		Residential	Retail	Office	Hotel
Scottsdale Road	North	13%	29%	22%	15%
Scottsdale Road	South	30%	35%	32%	25%
Mockingbird Lane	North	2%	2%	2%	0%
Mockingbird Lane	South	0%	2%	2%	0%
Indian Bend Road	East	29%	16%	20%	15%
Lincoln Drive	East	0%	2%	0%	0%
Lincoln Drive	West	26%	14%	22%	45%
Total		100%	100%	100%	100%

The percentages presented in **Table 7** are summarized in **Figure 5**, **Figure 6**, **Figure 7** and **Figure 8** for the residential, retail, office and hotel distributions respectively. The percentages presented in these figures were applied to the site trips generated to determine the AM, PM and Saturday peak hour site traffic at the intersections within the study area. **Figure 9** presents the resulting site generated traffic for the proposed development by the 2023 build out year. Average daily total volumes presented in this figure were extracted from traffic model used to assign trips to the surrounding roadway network

**LEGEND**

Percentage Trip Distribution



Figure 5: Residential Distribution

Source: CivTech, Inc. 2020

**LEGEND**

Percentage Trip Distribution



Figure 6: Retail Distribution

Source: CivTech, Inc. 2020

**LEGEND**

Percentage Trip Distribution

**Figure 7:** Office Distribution

Source: CivTech, Inc. 2020

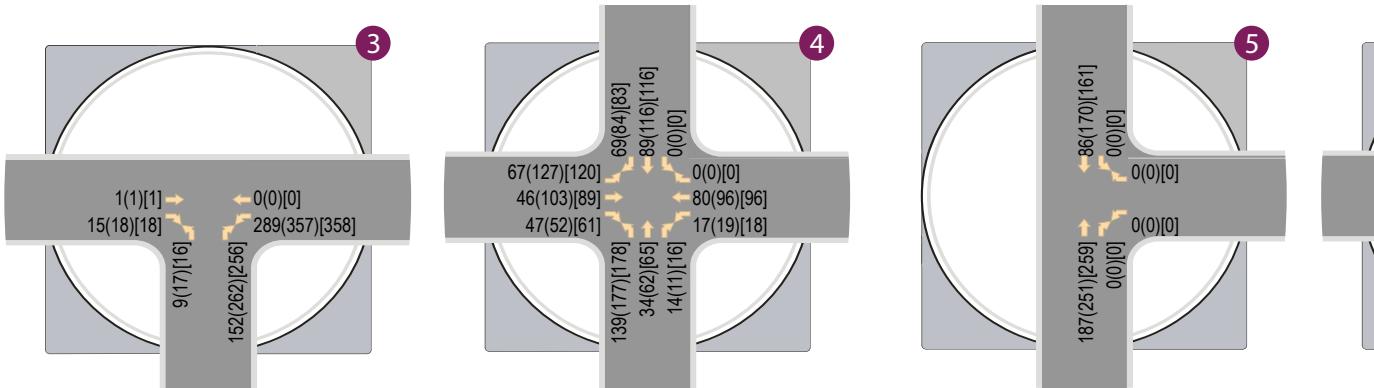
**LEGEND**

Percentage Trip Distribution



Figure 8: Hotel Distribution

Source: CivTech, Inc. 2020



Scottsdale Plaza Resort & Indian Bend Rd.

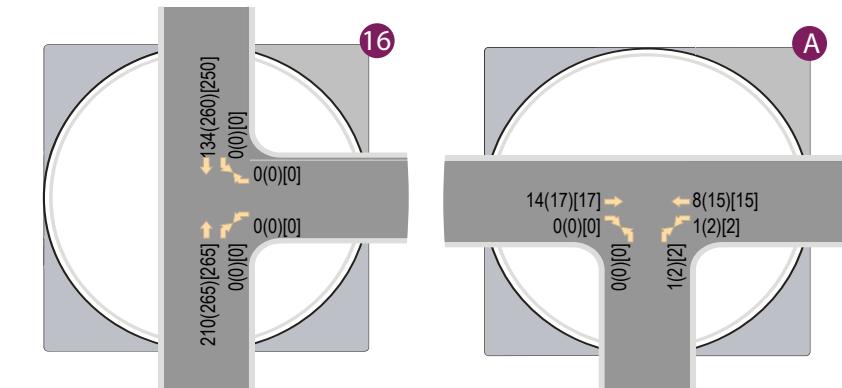
Scottsdale Rd. & Indian Bend Rd

Scottsdale Rd. & Joshua Tree Ln.

Scottsdale Rd. & 6750 North

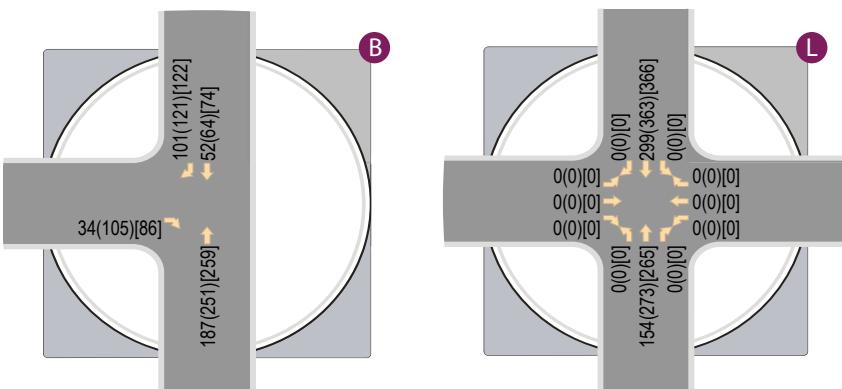
Quail Run Rd & Lincoln Dr.

Scottsdale Rd. & Lincoln Dr.



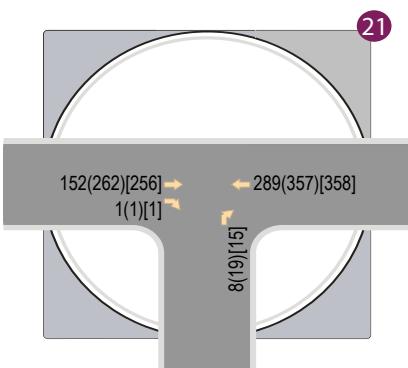
Scottsdale Rd. & Tuckey Ln.

Palmeraie Dr. & Indian Bend Rd.



Scottsdale Rd. & Street B

Street C & 6750 North



RIRO Access & Indian Bend Rd.

LEGEND

XX(XX)[XX] - AM(PM)[Sat] Peak Hour Traffic Volumes
XX.XXX - Average Daily Traffic Volumes



Figure 9: 2023 Site Traffic Volumes

Source: CivTech, Inc. 2020

FUTURE BACKGROUND TRAFFIC

Background traffic is often projected by applying a growth factor to existing traffic. This study applies a 0.5 percent annual growth rate which is the same as was applied within the originally approved Palmerae TIMA and the TIA for the adjacent Ritz Carlton development. The growth rate was selected after reviewing historical daily traffic volumes within the vicinity of the site, published by the City of Scottsdale and Town of Paradise Valley. This growth rate equates to growth factors of 1.041 for the 2023 study year. Background growth calculations are included within **Appendix F**.

The adjacent Ritz Carlton development, which is currently being constructed, will also add traffic to the study roadways. Ritz Carlton is located west of the site and extends south to Lincoln Drive and west to Mockingbird Lane, except for an out parcel of an existing church. Ritz Carlton consists of Hotel, residential, and resort related retail land uses. Access to Ritz Carlton will be provided at the existing roundabout on Indian Bend Road, at the Quail Run Road alignment on Lincoln Drive and at driveways on the extension of 6750 North. The developer of Ritz-Carlton is also the owner of the proposed Palmerae development and is anticipated to develop the two developments concurrently. The developer has updated the phasing of individual parcels since the final TIA for the Ritz Carlton was prepared. By 2023, all parcels associated with Ritz Carlton are considered to be fully constructed.

The nearby Mountain Shadows Resort redevelopment will also add traffic to the study roadways. As of May 2020, the resort has been mostly completed with the exception of a few of the later phases proposed in the original TIA, however, since the existing volumes that have been utilized as a baseline condition for this TIMA are from 2016, the approved trip generation for the Mountain Shadows Resort was used in the background volume calculations.

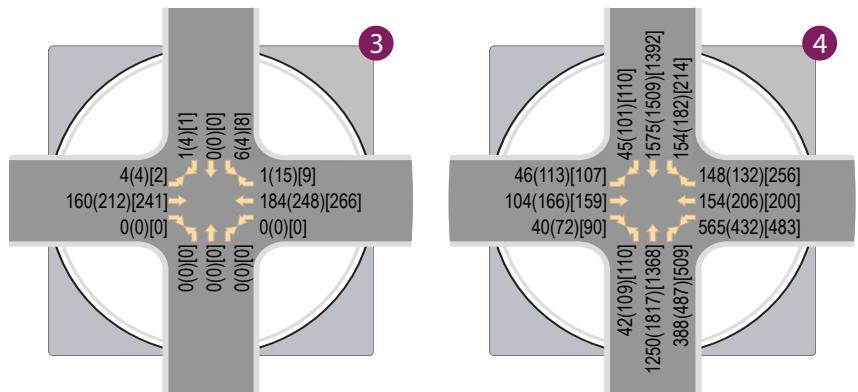
Selected excerpts of the *Ritz Carlton Traffic Impact Analysis*, *Mountain Shadows Traffic Impact Analysis* and traffic volume depictions are included within **Appendix F**. Any traffic volumes generated by other developments are assumed to be accounted for within the growth factors applied to the existing traffic counts. The background traffic for the study year 2023 is projected by applying the applicable growth factor to the existing traffic volumes and then adding the traffic generated by both Ritz Carlton and Mountain Shadows Resorts. Projected background traffic for 2023 is depicted in **Figure 10**.

The average daily total (ADT) traffic volumes presented on the vicinity map in this figure were determined by assuming that the AM peak hour traffic accounts for 8% of daily traffic and that the PM peak hour traffic accounts for 10% of daily traffic. These two values were then averaged to estimate the daily traffic on the roadway network for the horizon year 2023.

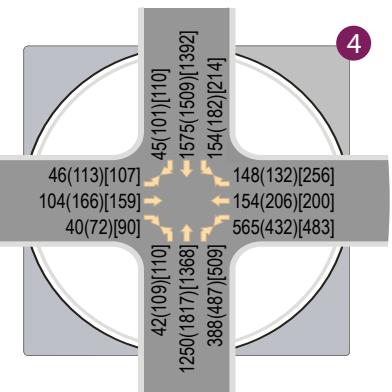
TOTAL TRAFFIC

Total traffic was determined by adding the site generated traffic to the background traffic for each study year. Projected total traffic for 2023 is depicted in **Figure 11**.

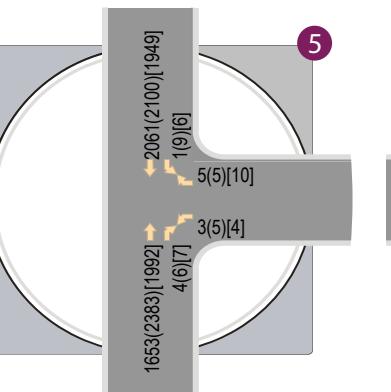
The average daily total traffic volumes presented on the vicinity map in this figure were determined by adding together the ADT values from the site volumes and the ADT values from the background volumes.



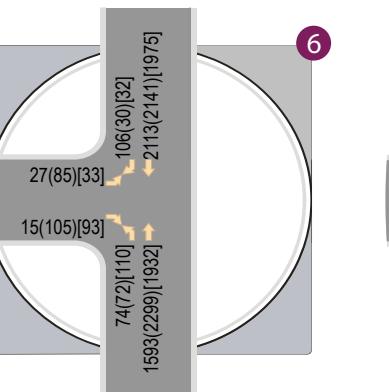
Scottsdale Plaza Resort & Indian Bend Rd.



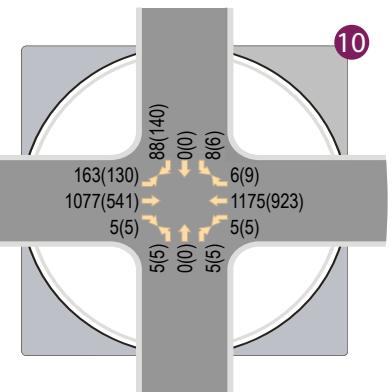
Scottsdale Rd. & Indian Bend Rd.



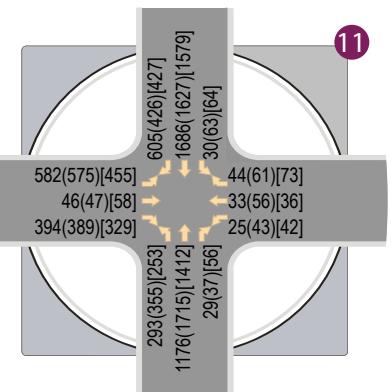
Scottsdale Rd. & Joshua Tree Ln.



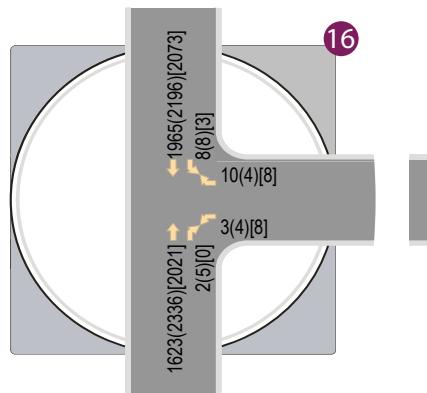
Scottsdale Rd. & 6750 North



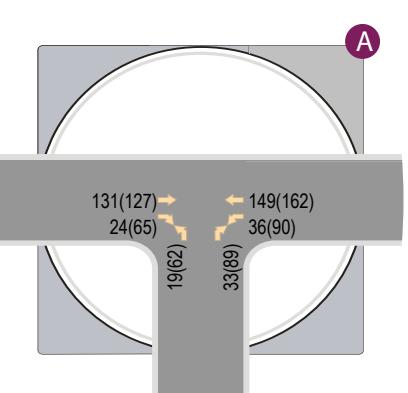
Quail Run Rd & Lincoln Dr.



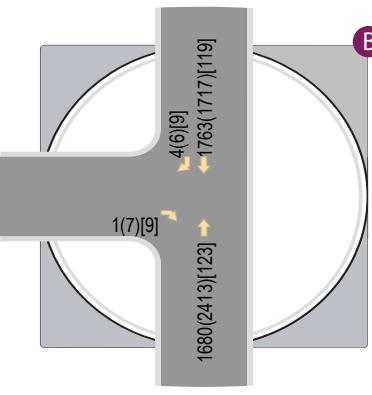
Scottsdale Rd. & Lincoln Dr.



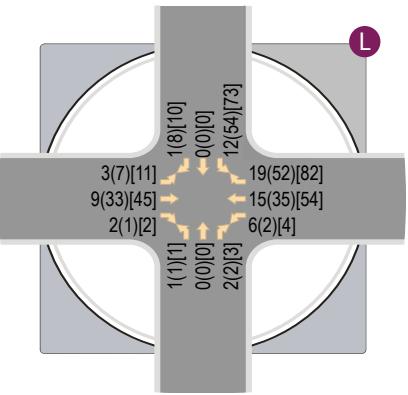
Scottsdale Rd. & Tuckey Ln.



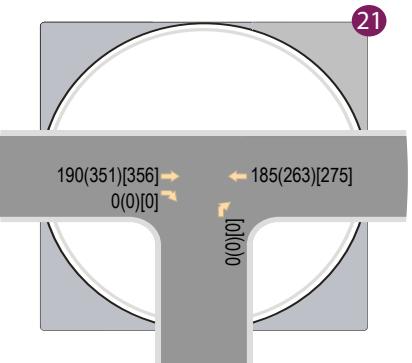
Palmeriae Dr. & Indian Bend Road



Scottsdale Road & Street B



Street C & 6750 North



RIRO Access & Indian Bend Rd.

LEGEND

XX(XX)[XX] - AM(PM)[Sat] Peak Hour Traffic Volumes
XX,XXX - Average Daily Traffic Volumes



Figure 10: 2023 Background Traffic Volumes

Source: CivTech, Inc. 2020

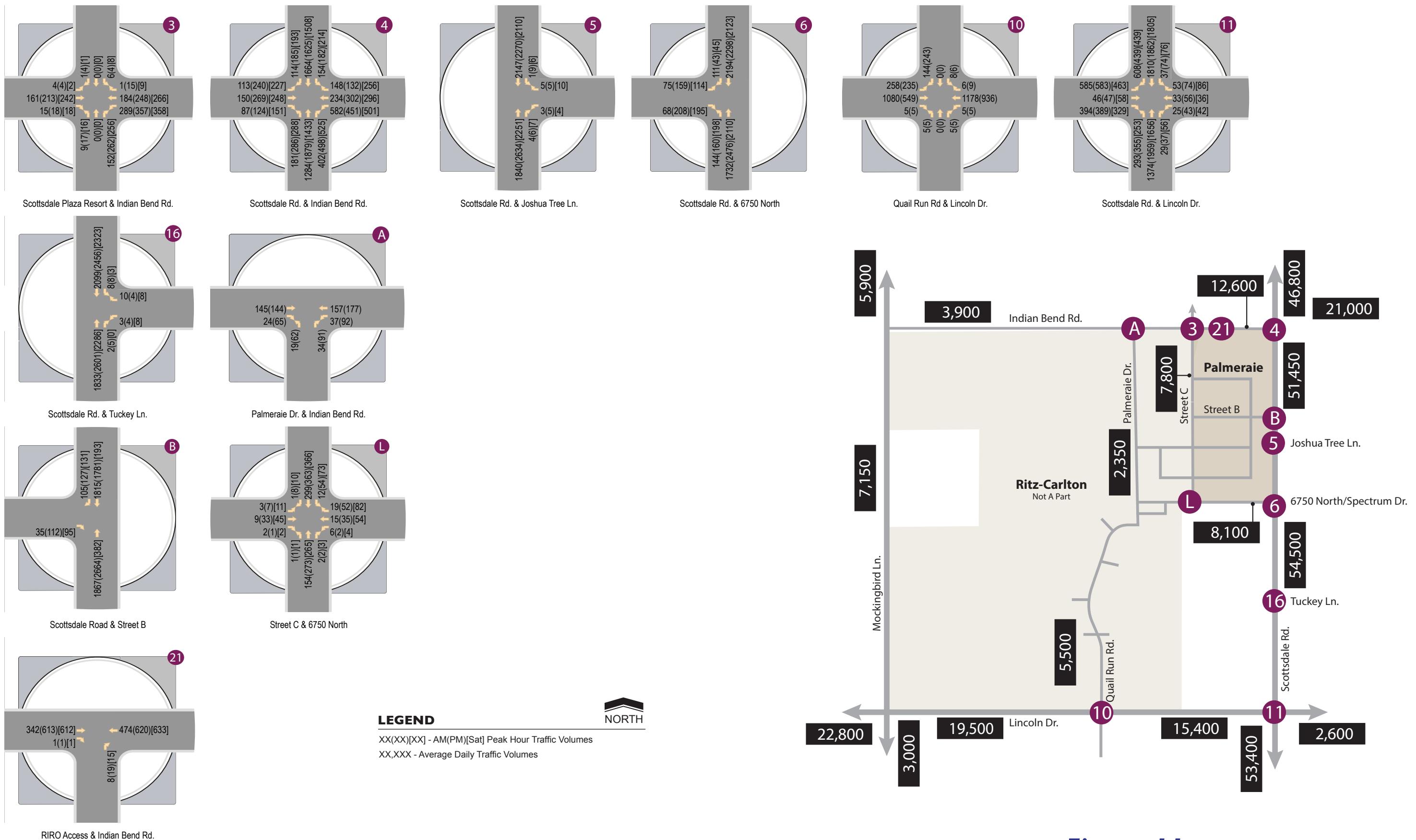


Figure II: 2023 Total Traffic Volumes

Source: CivTech, Inc. 2020

TRAFFIC AND IMPROVEMENT ANALYSIS

Peak hour capacity analyses have been conducted for the study intersections and all site access points for the 2023 horizon year. All intersections have been analyzed as such using the methodologies previously discussed. The overall intersection and approach levels of service are summarized in **Table 8** for the 2023 background and total traffic conditions. Detailed analysis worksheets for the 20203 analysis can be found in Appendix G.

Table 8 – Peak Hour Levels of Service

ID	Intersection	Control	Movement	2023 LOS		
				No-Build AM(PM)[Sat]	Full-Build AM(PM)[Sat]	Mitigated AM(PM)[Sat]
3	Scottsdale Plaza Resort Driveway & Indian Bend Rd.	Roundabout	NB	A(A)[A]	A(A)[A]	[Not Mitigated]
			SB	A(A)[A]	A(A)[A]	
			EB	A(A)[A]	A(A)[A]	
			WB	A(A)[A]	A(A)[A]	
4	Scottsdale Rd. & Indian Bend Rd.	Signalized	Overall	A(A)[A]	A(A)[A]	
			NB left	D(D)[D]	D(D)[C]	D(E)[F]
			NB thru	A(B)[C]	A(B)[C]	B(F)[C]
			NB right	A(A)[B]	A(A)[B]	A(A)[B]
			SB left	D(E)[D]	D(D)[C]	D(D)[F]
			SB thru	D(C)[C]	D(C)[C]	D(D)[C]
			SB right	B(D)[B]	B(B)[C]	B(B)[B]
			EB left	E(E)[D]	E(E)[D]	E(E)[D]
			EB thru	E(F)[E]	F(F)[F]	E(E)[E]
			EB right	E(D)[E]	F(F)[F]	E(E)[E]
			WB left	E(E)[D]	E(E)[D]	E(E)[D]
			WB thru	D(D)[C]	D(F)[D]	D(D)[D]
			WB right	B(B)[B]	B(B)[B]	B(B)[B]
			Overall	C(C)[C]	C(D)[D]	D(D)[D]
5	Scottsdale Rd. & Joshua Tree Ln.	1-way stop (WB)	SB left	D(F)[E]	D(F)[F]	[Not Mitigated]
			WB shared	F(F)[F]	F(F)[F]	
6	Scottsdale Rd. & 6750 North/Spectrum Drive	Signalized	NB left	C(D)[C]	C(D)[C]	C(C)[C]
			NB thru	A(A)[A]	A(A)[A]	A(A)[A]
			SB thru	A(C)[A]	B(C)[A]	B(C)[A]
			SB right	A(B)[A]	A(B)[A]	A(B)[A]
			EB left	E(E)[D]	E(E)[D]	E(E)[D]
			EB right	C(C)[C]	C(D)[C]	C(C)[C]
			Overall	A(B)[A]	A(B)[A]	A(B)[A]
10	Quail Run Rd. & Lincoln Dr.	Signalized	NB left	E(D)[A]	D(D)[A]	[Not Mitigated]
			NB thru	A(A)[A]	A(A)[A]	
			NB right	A(A)[A]	A(A)[A]	
			SB left	E(D)[B]	D(D)[B]	
			SB thru	A(A)[A]	A(A)[A]	
			SB right	E(E)[B]	E(E)[B]	
			EB left	A(A)[A]	B(B)[B]	
			EB thru	A(A)[A]	A(A)[A]	
			EB right	A(A)[A]	A(A)[A]	
			WB left	A(A)[A]	A(A)[A]	
			WB thru	A(A)[B]	B(B)[B]	
			WB right	A(A)[B]	A(A)[B]	
			Overall	A(B)[B]	B(B)[B]	

Table 8 – Peak Hour Levels of Service

ID	Intersection	Control	Movement	2023 LOS		
				No-Build AM(PM)[Sat]	Full-Build AM(PM)[Sat]	Mitigated AM(PM)[Sat]
11	Scottsdale Rd. & Lincoln Dr.	Signalized	NB left	D(D)[D]	E(D)[D]	F(E)[E]
			NB thru	C(D)[C]	C(D)[C]	C(D)[D]
			NB right	C(D)[C]	C(D)[C]	C(D)[D]
			SB left	E(F)[D]	E(F)[E]	E(E)[D]
			SB thru	D(E)[E]	E(F)[F]	E(F)[E]
			SB right	D(B)[E]	D(A)[E]	C(B)[E]
			EB left	E(D)[D]	F(E)[D]	E(E)[D]
			EB thru	E(D)[D]	E(D)[D]	D(E)[D]
			EB right	C(C)[C]	C(C)[C]	C(C)[C]
			WB left	E(D)[D]	E(D)[D]	E(D)[D]
			WB thru	E(D)[D]	D(D)[D]	D(D)[D]
			WB right	E(D)[D]	D(D)[D]	D(D)[D]
			Overall	D(D)[D]	D(E)[E]	D(E)[D]
16	Scottsdale Rd. & Tuckey Ln.	1-way stop (WB)	SB left	D(F)[E]	E(F)[F]	[Not Mitigated]
			WB shared	E(F)[F]	F(F)[F]	
A	Palmeraie Drive & Indian Bend Rd.	1-way stop (NB)	NB left	B(B)[B]	B(B)[B]	[Not Mitigated]
			NB right	A(A)[A]	A(A)[A]	
			WB left	A(A)[A]	A(A)[A]	
B	Scottsdale Rd. & Street B	1-way stop (EB)	EB right	C(C)[A]	D(E)[B]	[Not Mitigated]
L	6750 North/Spectrum Drive & Street C	2-way stop (NB/SB)	NB shared	A(A)[A]	B(B)[B]	[Not Mitigated]
			SB shared	A(A)[B]	B(C)[D]	
			EB left	A(A)[A]	A(A)[A]	
			WB left	A(A)[A]	A(A)[A]	
21	RIRO Access & Indian Ben Rd.	1-way stop (NB)	NB Right	-(-)[-]	A(B)[B]	[Not Mitigated]

The results of the future analyses indicate that all signalized intersections are anticipated to operate overall at LOS D or better except the intersection of Scottsdale Road and Lincoln Drive. Some of the intersections on Scottsdale Road have one or more movement that operate with LOS E or F during the AM, PM or Saturday peak hours.

The southbound left and westbound shared movements at the intersections of **Scottsdale Road and Joshua Tree Lane** and **Scottsdale Road and Tuckey Lane** are anticipated to experience elevated delay during the 2023 opening year.

As written previously, discussions with residents indicates that gaps are created for cross traffic as some drivers allow turning movements to occur during congestion when the 6750 North/Spectrum Drive signal is red for Scottsdale Road traffic and northbound traffic backs up.

Traffic signal timing adjustments required to facilitate additional vehicles using 6750 North/Spectrum Drive should create a longer interval for gaps, helping the residents on Joshua Tree Lane and Tuckey Lane ingress and egress their neighborhoods.

CivTech recommends that the city post a sign indicating "DO NOT BLOCK INTERSECTION" and consider cross-hatching pavement markings.

The intersection of *Scottsdale Road and Indian Bend Road* is expected to operate at LOS C overall during the AM peak hour and operate at LOS D during the PM and Saturday peak hours. Some of the individual movements or approaches are anticipated to operate with poor levels of service, however, with signal timing adjustments, many of those delays are anticipated to be mitigated.

The intersection of *Scottsdale Road and 6750 North/Spectrum Drive* is expected to operate at LOS A overall during the AM peak hour, LOS B overall during the PM peak hour and LOS A overall during the Saturday peak hour. These levels of service were achieved with the addition of a second northbound left turn lane at this location. This turn lane is recommended to be constructed along with the Palmerae development to facilitate northbound left turn vehicles which could queue back into the through lane blocking traffic. The need for the additional northbound left turn lane can be monitored as building continues at Palmerae to further evaluate traffic patterns as they develop.

The intersection of *Scottsdale Road and Lincoln Drive* is expected to operate at LOS D overall during the AM peak hour, LOS E overall during the PM peak hour and LOS D overall during the Saturday peak hour. With signal timing adjustments, the overall intersection and some individual movements are expected to operate at LOS E during the peak hours. This is largely due to the relatively high eastbound left turn volumes. The intersection will benefit from adjustments to signal phase splits.

The eastbound right turn movement at the intersection of *Scottsdale Road and Street B* is anticipated to operate at LOS E during the PM peak hour. The projected 95th percentile queue length discussed in a later section is 85 feet, which is less than the available on-site storage prior to an intersection. The characteristics of the driveway also allows a faster egress speed which may increase its efficiency and decrease delay.

TURN LANE WARRANTING AND QUEUE LENGTH ANALYSIS

TURN LANE NEEDS

A right turn lane will be provided into the proposed driveway on Scottsdale Road. The left turn movement is restricted by Scottsdale Road's raised median. Turns at Street B will be facilitated by a roundabout.

QUEUE STORAGE

Adequate turn storage should be supplied on any approach where turn lanes are permitted and/or warranted. A queuing analysis was performed for all warranted/recommended and existing intersection turn lanes where site traffic is expected as well as left turn lanes adjacent to the site. According to the methodology documented in *A Policy on Geometric Design of Highways and Streets* (the AASHTO "Green Book"), the storage length for a turn lane is typically estimated as the length required to hold the average number of arriving vehicles per two minutes, where unsignalized, or per one-and-a half signal cycles, where signalized.¹ The formulas used for the calculations are shown below.

¹ The American Association of Highway and Transportation Officials on pages 714-715 of its publication, *Geometric Design of Highways and Streets* ("AASHTO Green Book"), indicates that storage length for a turn lane, exclusive of taper, "should usually be based on one and one-half to two times the average number of vehicles that would store per cycle" at a signalized intersection.

For signalized intersections, the storage length is determined by the following formula:

$$\text{Storage Length} = [1.5 \times (\text{veh/hr}) / (\text{cycles/hr})] \times 25 \text{ feet}$$

For unsignalized intersections, the storage length is determined by the following formula:

$$\text{Storage Length} = [(\text{veh/hr}) / (30 \text{ periods/hr})] \times 25 \text{ feet}$$

The total projected traffic volumes were utilized for the calculations. From this, the resulting turn lane storage for turn movements using AASHTO guidelines were calculated and are summarized in

Table 9. Calculations for the AASHTO queue storage length recommendations and the 95th percentile HCM 2016 queue storage length recommendations are provided in **Appendix H**. The 95th percentile HCM 2016 queue storage lengths are given in vehicles and multiplied by 25 feet per vehicle to determine the storage length.

Table 9 – Queue Storage Lengths

ID	Intersection	Control	Turn Lane	Existing Storage ⁽¹⁾	HCM 95 th %-ile	Recommended Storage
4	Scottsdale Road & Indian Bend Road	Signalized	NB left NB right SB left ⁽²⁾ SB Right EB left WB left WB right	235' 215' 400' - 95' 525' 265'	290' 280' 185' 85' 145' 295' 140'	⁽²⁾ ⁽⁴⁾ 470' 215' ⁽⁴⁾ 400' ⁽⁹⁾ 165' ⁽³⁾ ⁽⁶⁾ 145' ⁽⁴⁾ 525' ⁽⁴⁾ 265'
5	Scottsdale Road & Joshua Tree Lane	1-Way Stop (WB)	SB left ⁽²⁾	150'	<25	⁽⁴⁾ 150'
6	Scottsdale Road & 6750 North	Signalized	NB left SB right EB left EB right	100' 100' 55' 55'	⁽²⁾ 190' 55' 105' 110'	⁽²⁾ 200' ⁽⁴⁾ 100' ⁽²⁾ ⁽⁶⁾ 105' ⁽²⁾ ⁽⁶⁾ 210'
11	Scottsdale Road & Lincoln Drive	Signalized	NB left ⁽²⁾ SB left SB right EB left ⁽²⁾ EB right WB left	470' 185' 160' 180' ⁽⁸⁾ 180' 90'	230' 85' 445' 525' 220' 75'	⁽⁴⁾ 470' ⁽⁴⁾ 185' ⁽⁵⁾ ⁽⁸⁾ 160' ⁽⁵⁾ ⁽⁸⁾ 180' ⁽⁷⁾ 180' ⁽⁴⁾ 90'
16	Scottsdale Road & Tuckey Lane	1-Way Stop (WB)	SB left	125'	<25	⁽⁴⁾ 125'
A	Palmerale Drive & Indian Bend Road	1-way Stop (NB)	NB Left	90'	<25'	⁽⁴⁾ 90'
B	Scottsdale Road & Street B	1-Way Stop (EB)	SB right EB right	---	<25' 90'	⁽³⁾ ⁽⁶⁾ 100' ⁽³⁾ ⁽⁶⁾ 100'
L	Street C & 6750 North	1-Way Stop (NB/SB)	EB left WB left	---	<25' ---	⁽³⁾ ⁽⁶⁾ 100' ⁽³⁾ ⁽⁶⁾ 100'

(1) Striped length from stop bar, measured using aerial photographs, rounded to the nearest 5-feet.

(2) Dual turn lanes. Values presented represent total combined length of both lanes

(3) Maximum queue length is set at 350' for signalized intersections. Scottsdale standards indicate right turn lanes on arterial roads and deceleration lanes should provide a minimum striped length of 100' with a preferred length of 150'.

(4) Existing queue storage provides sufficient space for future volumes.

(5) Existing queue storage is less than predicted demand; however, mitigation is not recommended as part of the project.

(6) Recommend constructing/extending turn lane to this length if possible.

(7) Turn lane cannot be extended due to prior turn lane or driveway.

(8) One or more turn lane is formed from a travel lane. Additional storage is available in this lane.

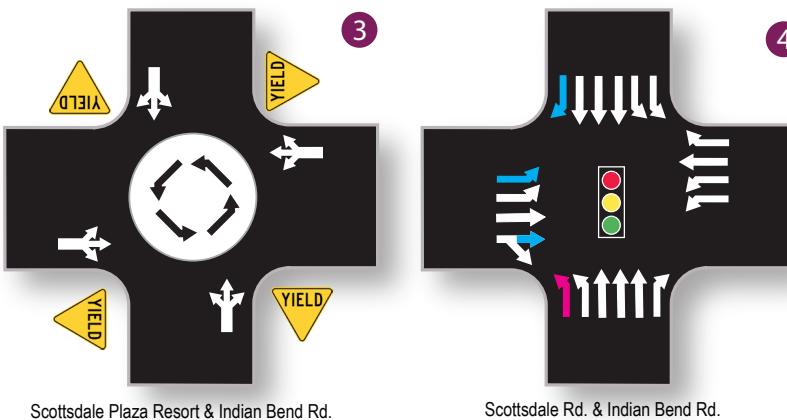
(9) Measurement based off Scottsdale road Pavement Marking and Signing Plan as part of Ritz Carlton Master Plan set

The intersection of Scottsdale Road and Indian Bend Road currently provides a single left turn lane on the northbound approach. However, with the anticipated increase in traffic at this location, it is recommended that the area currently striped out on the northbound approach be re-striped to a second northbound left turn lane of the same length as the first, 235 feet.

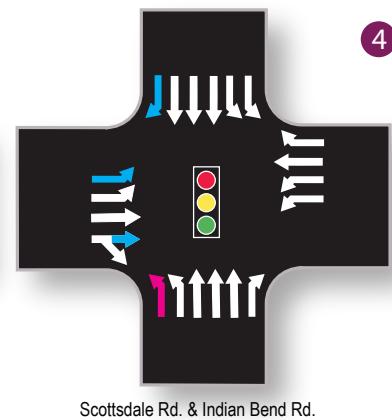
At the intersection of Scottsdale Road and 6750 North/Spectrum Drive, a single northbound left turn lane currently exists. It is recommended that by the full buildout condition of Palmeraie, dual northbound left turn lanes be constructed at this location. With dual turn lanes, both lanes could be 100 feet in length and provide sufficient storage for vehicles turning north to west. A total of 190 feet is required which exceeds the length provided by a single lane.

The new southbound right turn lane on Scottsdale Road approaching Street B is recommended to be constructed with a minimum of 100 feet of queue storage.

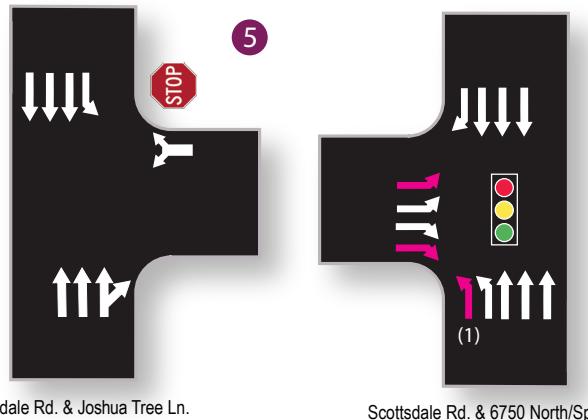
The recommended storage lengths in **Table 9** are provided for study horizon year 2023 using the total traffic projections. Proposed lane configurations are shown in **Figure 12**.



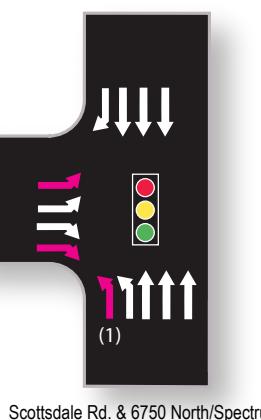
Scottsdale Plaza Resort & Indian Bend Rd.



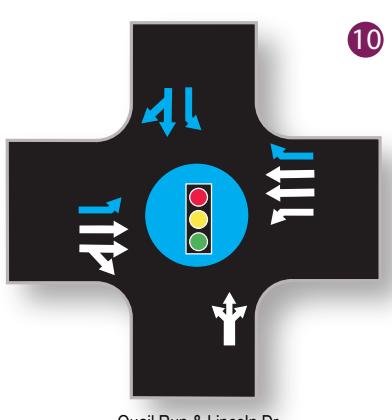
Scottsdale Rd. & Indian Bend Rd.



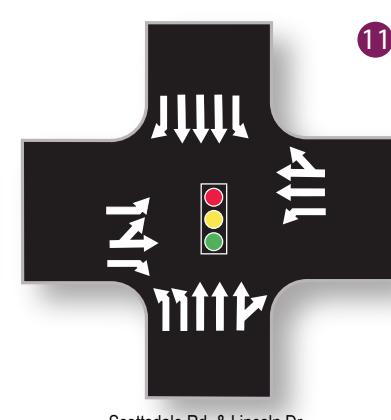
Scottsdale Rd. & Joshua Tree Ln.



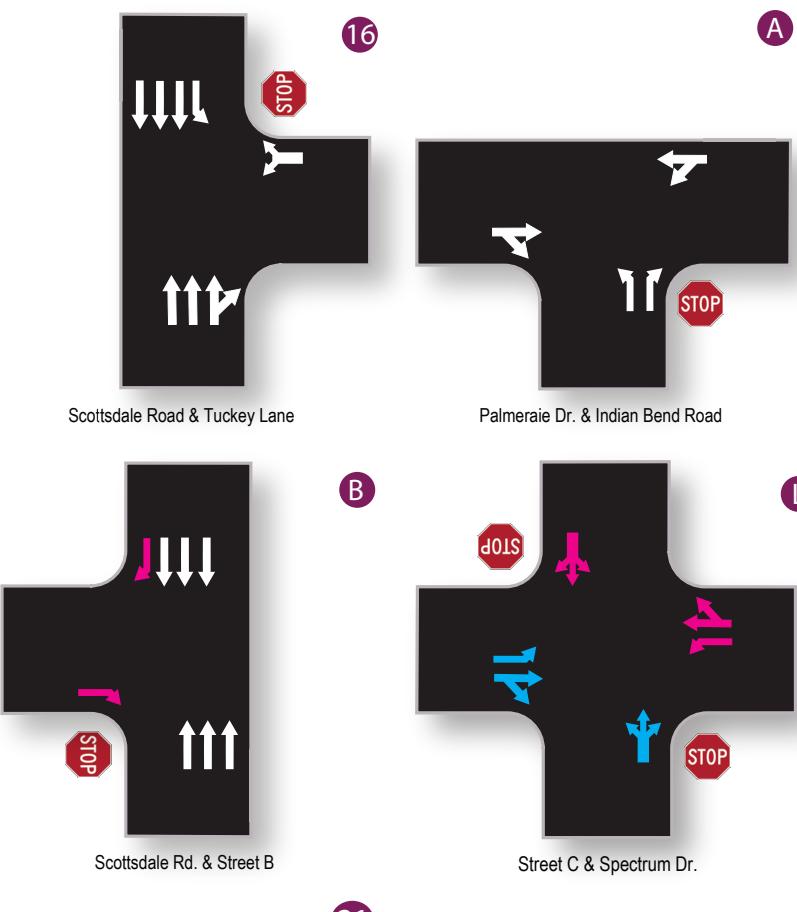
Scottsdale Rd. & 6750 North/Spectrum Dr.



Quail Run & Lincoln Dr.

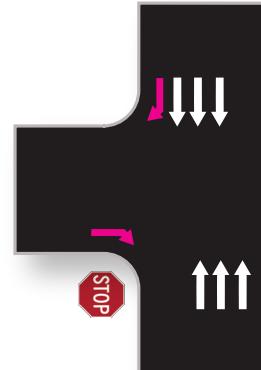


Scottsdale Rd. & Lincoln Dr.

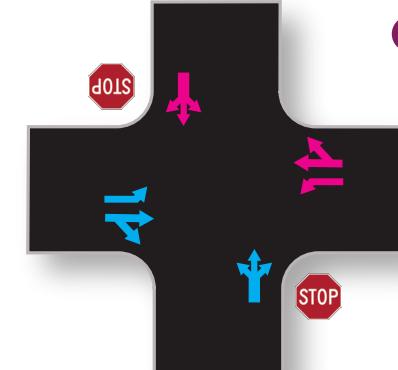


Scottsdale Road & Tuckey Lane

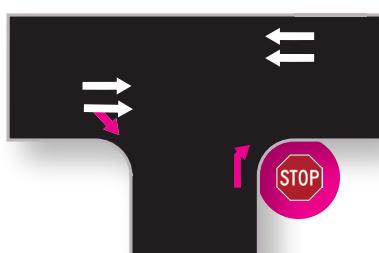
Palmerae Dr. & Indian Bend Road



Scottsdale Rd. & Street B



Street C & Spectrum Dr.



RIRP Access & Indian Bend Road

(1) Traffic patterns and queue storage for this movement should be monitored to determine when/if installation is warranted.

LEGEND	
Thru or Turning Movement	Traffic Signal
Two-Way Left Turn-Lane	Stop Sign
Raised Median	Speed Limit
Changes Planned by Ritz Carlton	
Proposed Changes	

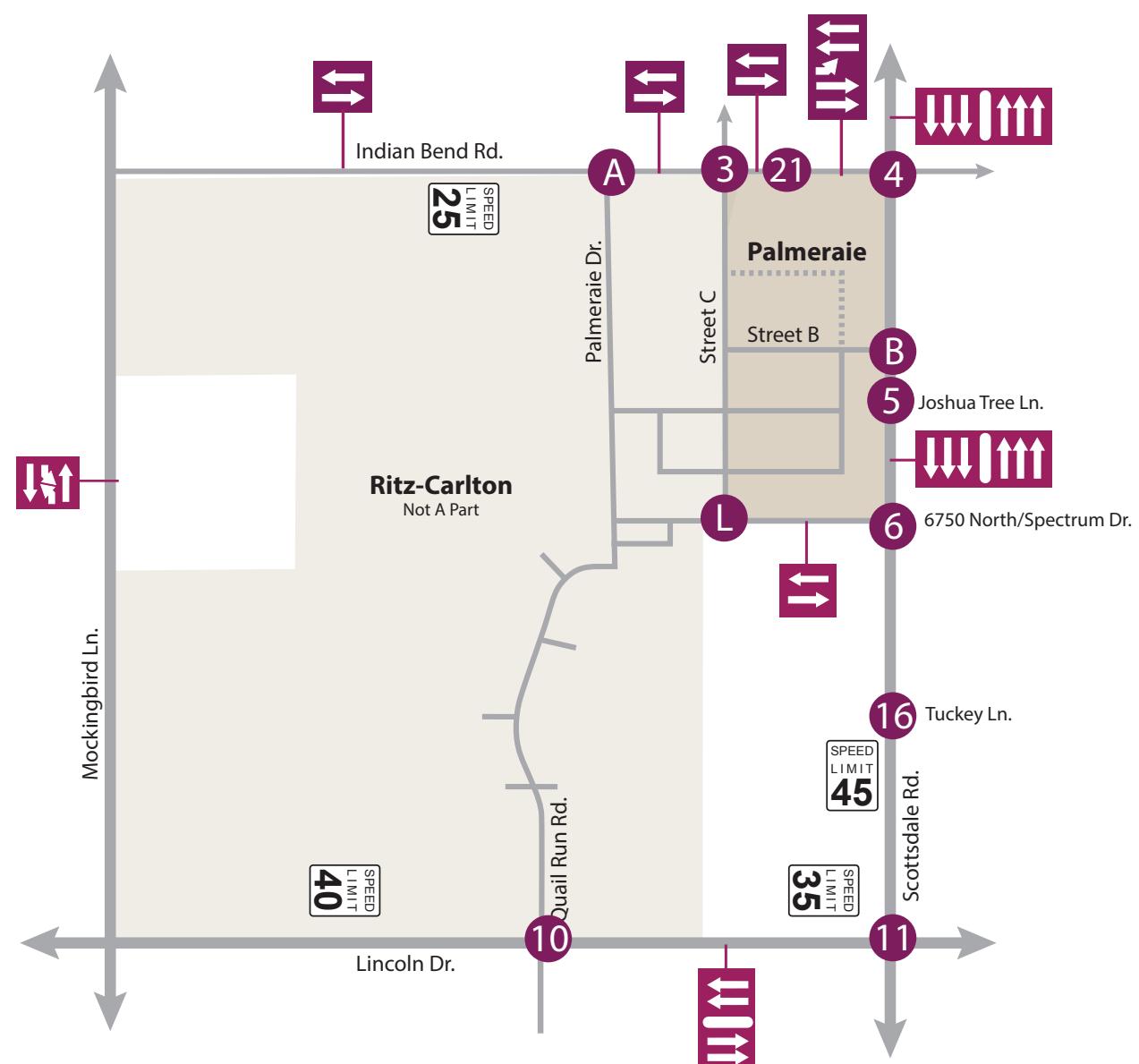


Figure 12: Proposed Lane Configurations and Traffic Controls

Source: CivTech, Inc. 2020

SIGHT DISTANCE ANALYSIS

There must be sufficient unobstructed sight distance along both approaches of an intersection and across their included corners to allow operators of vehicles to see each other in time to prevent a collision. The sight triangle is the area encompassed by the line of sight from a stopped vehicle on the minor roadway to the approaching vehicle on the major roadway.

An intersection site distance analysis was performed to set guidelines for establishing line of sight for the proposed development at major internal intersections. Using the guidelines set forth by *A Policy on Geometric Design of Highways and Streets*, **Table 10** was generated for each intersection created by a new site access point.

A major component of calculating sight distance is vehicle travel speed. For this analysis, the following speeds were assumed for each roadway based on their functional classification.

- Scottsdale Road 50 mph Principal Arterial
- Indian Bend Road 35 mph Minor Collector

Table 10 – Intersection Sight Distance Summary

Site Access	Required Sight Dist. Left (ft)	Required Sight Dist. Right (ft)	Existing Sight Dist. Left (ft)	Existing Sight Dist. Right (ft)
At Indian Bend Drive	395	445	1000+	1000+
At Scottsdale Road	560	635	1000+	1000+

There are no existing obstructions to sight distance within the project intersections or along the included corners of the existing intersections. Adequate sight distance must be provided at the intersections to allow safe left and right turning movements from the development. Recommended distances for these movements can be found in the table above.

Sight distance is largely based on the design speed of the roadway. When the posted speed limit is reduced, the required sight distance will also be reduced as a result. Sight distance calculations are included within **Appendix I**.

CONCLUSIONS

The following conclusions have been documented in this study:

GENERAL

- The proposed development, once fully constructed, is anticipated to generate 15,440 weekday daily trips, 936 trips during the AM peak hour, and 1,383 trips during the PM peak hour, and 1,802 trips during a Saturday mid-day peak hour.

EXISTING

- The results of the existing analyses indicate that all signalized intersections operate overall at LOS C or better, although most study intersections on Scottsdale Road have one or more movements that operate at LOS E or F during the AM, PM and/or Saturday peak hours.
 - The southbound left and westbound shared movements at the intersections of ***Scottsdale Road and Joshua Tree Lane*** and ***Scottsdale Road and Tuckey Lane*** experience elevated delays during the PM and Saturday peak hours. Elevated delay at stop controlled movements at intersections with major roadways is not uncommon.
 - Discussions with residents indicate that gaps are created for cross traffic as some drivers allow turning movements to occur during congestion when the 6750 North/Spectrum Drive signal is red for Scottsdale Road traffic and northbound traffic backs up. Traffic signal timing adjustments required to facilitate additional vehicles using 6750 North/Spectrum Drive should create a longer interval for gaps, helping the residents on Joshua Tree Lane and Tuckey Lane ingress and egress their neighborhoods.
 - CivTech recommends that the city post a sign indicating "DO NOT BLOCK INTERSECTION" and consider cross-hatch pavement markings.

OPENING YEAR 2023

- The results of the future analyses indicate that all signalized intersections are anticipated to operate overall at LOS D or better except the intersection of Scottsdale Road and Lincoln Drive. Some of the intersections on Scottsdale Road have one or more movement that operate with LOS E or F during the AM, PM or Saturday peak hours.
 - The southbound left and westbound shared movements at the intersections of ***Scottsdale Road and Joshua Tree Lane*** and ***Scottsdale Road and Tuckey Lane*** are anticipated to experience elevated delay during the 2023 opening year.
 - Discussions with residents indicates that gaps are created for cross traffic as some drivers allow turning movements to occur during congestion when the 6750 North/Spectrum Drive signal is red for Scottsdale Road traffic and northbound traffic backs up.

- Traffic signal timing adjustments required to facilitate additional vehicles using 6750 North/Spectrum Drive should create a longer interval for gaps, helping the residents on Joshua Tree Lane and Tuckey Lane ingress and egress their neighborhoods.
- CivTech recommends that the city post a sign indicating "DO NOT BLOCK INTERSECTION" and consider cross-hatching pavement markings.
- The intersection of **Scottsdale Road and Indian Bend Road** is expected to operate at LOS C overall during the AM peak hour and operate at LOS D during the PM and Saturday peak hours. Some of the individual movements or approaches are anticipated to operate with poor levels of service, however, with signal timing adjustments, many of those delays are anticipated to be mitigated.
- The intersection of **Scottsdale Road and 6750 North/Spectrum Drive** is expected to operate at LOS A overall during the AM peak hour, LOS B overall during the PM peak hour and LOS A overall during the Saturday peak hour. These levels of service were achieved with the addition of a second northbound left turn lane at this location. This turn lane is recommended to be constructed along with the Palmeraie development to facilitate northbound left turn vehicles which could queue back into the through lane blocking traffic. The need for the additional northbound left turn lane can be monitored as building continues at Palmeraie to further evaluate traffic patterns as they develop.
- The intersection of **Scottsdale Road and Lincoln Drive** is expected to operate at LOS D overall during the AM peak hour, LOS E overall during the PM peak hour and LOS D overall during the Saturday peak hour. With signal timing adjustments, the overall intersection and some individual movements are expected to operate at LOS E during the peak hours. This is largely due to the relatively high eastbound left turn volumes. The intersection will benefit from adjustments to signal phase splits.
- The eastbound right turn movement at the intersection of **Scottsdale Road and Street B** is anticipated to operate at LOS E during the PM peak hour. The projected 95th percentile queue length discussed in a later section is 85 feet, which is less than the available on-site storage prior to an intersection. The characteristics of the driveway also allows a faster egress speed which may increase its efficiency and decrease delay.

QUEUE STORAGE

- The intersection of Scottsdale Road and Indian Bend Road currently provides a single left turn lane on the northbound approach. However, with the anticipated increase in traffic at this location, it is recommended that the area currently striped out on the northbound approach be re-striped to a second northbound left turn lane of the same length as the first, 235 feet.

- At the intersection of Scottsdale Road and 6750 North/Spectrum Drive, a single northbound left turn lane currently exists. It is recommended that by the full buildout condition of Palmeraie, dual northbound left turn lanes be constructed at this location. With dual turn lanes, both lanes could be 100 feet in length and provide sufficient storage for vehicles turning north to west. A total of 190 feet is required which exceeds the length provided by a single lane.
- The new southbound right turn lane on Scottsdale Road approaching Street B is recommended to be constructed with a minimum of 100 feet of queue storage.

SIGHT DISTANCE

- There are no existing obstructions to sight distance within the project intersections or along the included corners of the existing intersections. Adequate sight distance must be provided at the intersections to allow safe left and right turning movements from the development. Recommended distances for these movements can be found in the **Table 10**.

LIST OF REFERENCES

Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis.
Transportation Research Board, Washington, D.C., 2018.

Manual on Uniform Traffic Control Devices. U.S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2009.

Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, Washington, D.C., 2016.

Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, Washington, D.C., 2014.

A Policy on Geometric Designs of Highways and Streets, American Association of State and Highway Transportation Officials, Washington D.C., 2011.

Design Standards & Policies Manual, Geometrics, City of Scottsdale, Arizona, 2018.

Ritz Carlton Traffic Impact Analysis (TIA), CivTech, Scottsdale, AZ, March 2016

Palmeraie Traffic Impact and Mitigation Analysis (TIMA), CivTech Inc., Scottsdale, AZ, September 2016.

Mountain Shadows Traffic Impact Analysis (TIA), CivTech, Scottsdale, AZ, June 2007

TECHNICAL APPENDICES

- APPENDIX A:** REVIEW COMMENTS AND RESPONSES (RESERVED)
- APPENDIX B:** EXISTING TRAFFIC COUNTS
- APPENDIX C:** EXISTING PEAK HOUR ANALYSIS
- APPENDIX D:** CRASH ANALYSIS WORKSHEETS
- APPENDIX E:** TRIP GENERATION CALCULATIONS
- APPENDIX F:** BACKGROUND GROWTH CALCULATIONS
- APPENDIX G:** 2023 PEAK HOUR ANALYSIS
- APPENDIX H:** QUEUE STORAGE ANALYSIS
- APPENDIX I:** SIGHT DISTANCE ANALYSIS

APPENDIX A

REVIEW COMMENTS AND RESPONSES (Reserved)

2nd Review Comments

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer Name, Agency: Brad Carr, City of Scottsdale

Item	Review Comment	(Code) & Response
1.	The site plan provided indicates a north-south road within Paradise Valley as Palmerae Drive and the east-west road extending from 6750 North signal is labeled Spetrum Drive. In multiple instances of the TIMA, the east-west road is referred to as Palmerae Drive, which may cause confusion.	(1) Palmerae Drive and Spectrum Drive have been updated accordingly throughout the TIA and the graphics.
2.	Please revise Table 6 to verify internal capture trip volumes with what is included in Appendix E.	(1) Table 6 has been revised with the proper internal capture values as presented in Appendix E.
3.	Please revise Tabel 6 to verify Saturday peak hour trips - ITE's Trip Generation manual provides data for all land use codes used (though may be at different times). The TIMA appears to overestimate base trips by roughly 380 compared to ITE rates.	(1) Saturday trip generation rates have been updated using the 10th edition of the Trip Generaiton Manual. Saturday Peak hour of generator was used when available, otherwise, peak hours of adjacent street were used for all land uses.
4.	Please revise Figures 9 and 11 to verify ADT's present.	(1) Figure 9 and Figure 11 have been updated with current ADT values
5.	Please revise the traffic and improvement analysis to verify summary of Scottsdale Road and Indian Bend Road matched Table 8 and Table 8 matched applicable reports in appendix. Also verify summary of Scottsdale Road and 6750 North/Palmerae Drive & Scottsdale Road and Lincoln Drive matches Table 8.	(1) The summary of the intersection of Scottsdale Road and Indian Bend Road has been updated and verified to be consistent throughout the report. The summary for Scottsdale Road and 6750 North has also been verified and updated where appropriate.
6.	Please revise Table 9 to correct an issue for Scottsdale Road and 6750 North, northbound left - a 95th percentile demand of 460 feet while providing on 160 feet will likely often block the through lane causing an unacceptable safety condition.	(1) A large portion of traffic was shifted to Indian Bend Road to equilize the left turn volumes at each intersection. Even with the shift in traffic; dual northbound left turn lanes will be recommended at this intersection so as to not cause blocking of the through movements on Scottsdale Road.
7.	Please revise Figure 12 and instances throughout related to the following	
a.	Scottsdale Road and Indian Bend Road - 2nd SB left turn lane already exists. 2016 existing condition may remain the same, but please indicate in narrative of existing conditions and include in future conditions.	(1) Figure 12 has been updated to indicate that the second southbound left turn lane at Scottsdale Road and Indian Bend Road already exists. Narrative has also been updated to indicate that it was not present in the 2016 condition, but is present today.
b.	Scottsdale Road and Indian Bend Road - prior case has stipulations to add southbound right turn lane. Include in proposed conditions.	(1) Proposed conditions now include a southbound right turn lane at the intersection of Scottsdale Road and Indian Bend Road.
c.	Scottsdale Road and Indian Bend Road - EB right turn lane shows conversion to 2nd through lane which is not reflected in the analysis, please verify.	(1) The existing right turn lane will be reconctructed as a shared through/right turn lane on the eastbound approach in the future condition. The analysis and Figure 12 have been updated to show this improvement.
d.	Scottsdale Road and 6750 North - Verify 2nd EB left turn lane.	(2) Based on the most recent set of plans, produced by CivTech in May 2019, the eastbound approach of Scottsdale Road and 6750 North will be reconstructed to include a second left turn lane.
e.	Scottsdale Road and 6750 North - NB left turn condition - geometry and/or site design must change so that vehicles making this turn do not cause blockage on Scottsdale Road.	(1) Dual northbound left turn lanes will be recommended at this intersection so as to not cause blocking of the through movements on Scottsdale Road. Even with redistribution of traffic to utilize Indian Bend Road, the queue storage anticipated at this intersection exceeds the existing queue length available. The dual turn lanes can be provided in a later phase to observe traffic flows as development occurs.
f.	Indian Bend Road between Intersection A and Intersection 3 - cross section indicating an EB left turn may need to be updated with roundabout condition.	(1) Cross sections have been updated and verified.



REPORT REVIEW

REPORT TITLE: Palmerae Master Traffic Impact Analysis

REPORT DATE: March 2016

PREPARED BY: Dawn Cartier, CivTech, Inc.

CASE #: 7-ZN-2106

REVIEWED BY: Phil Kercher and John Bartlett

REVIEW DATE: April 2016

COMMENTS:

1. Page 11 – Provide a 24-hour segment traffic volume for Lincoln Drive between Quail Run and Scottsdale Road in Table 2.
2. Page 16 – The paragraph on the collision experience is a bit confusing. It's not clear why the collisions would need to be gleaned from more than 100,000 collisions and why they are not from an official source. The City of Scottsdale will provide collision data upon request. Also, the collision data is contained in Appendix C, not Appendix D.
3. Page 18 – Rear-end collisions are the most prevalent at signalized intersections. Before recommending that the Indian Bend and Scottsdale Road intersection should be further evaluated by City staff, provide some more data regarding the collision trends, such as whether the rear-end collisions are primarily on one approach or not.
4. Page 19 – Although there may be enough pavement width on Indian Bend at the Scottsdale Road intersection for a four lane approach, this is only because the curb return was set anticipating a four-lane cross section. There is only enough width for one lane 170 feet west of the crosswalk. This is not adequate for the appropriate storage and tapers, so the statement that needed lane configuration can be accomplished without modifying the roadway width is not correct.
5. Page 20 and 23 – Retail Square footage on page 20 does not match the retail square footage in Table 7.
6. Page 21 – Include a full Ritz Carlton development site plan in addition to the Palmerae site plan for reference.
7. Page 22 – Phase 1 improvements need to include the widening of Indian Bend Road to accommodate site traffic.
8. Page 22 - Provide documentation to support the 20 percent internal capture value.

9. Page 23 - The previous Palmerae development did not complete the rezoning process; therefore, the trip generation of the proposed development should be compared to land uses allowed under existing zoning, not to the proposed land uses in the development plan from the 2008 application, which was not approved. Resort hotel land use was used for comparison in the 2008 traffic study.
10. Page 24 - The proposed trip distributions shown in Figures 5 – 8 for the various land uses are not acceptable. These appear to have been heavily weighted to Lincoln Drive, especially for the hotel distribution. The distributions do not appear to reflect how the roadway network is used today.
11. Page 24 – Table 8 percentages listed under each land use do not total 100 percent except for the office land use.
12. Figures 5 – 8 - Does the traffic distribution to the Palmerae site include traffic assigned to Street A or Mockingbird Lane between Indian Bend Road and Lincoln Drive? If so, include that in Figure 6. These figures should be for the Palmerae site, not the Ritz Carlton site.
13. Figure 6 - The distribution of retail trips onto Mockingbird Lane accounts for over 900 daily trips. Is this realistic? Is this local traffic or traffic from the region routed through the local neighborhoods?
14. Provide daily volumes on Indian Bend Road and Lincoln Drive east of Scottsdale Road on all traffic volume figures.
15. Figures 9 – 12 – Include the daily traffic volumes for Mockingbird Lane, Street A, Indian Bend Road west of the site, and Lincoln Drive west of the site.
16. Figures 10 - The trip generation does not match the trip assignment in Figure 10. If new trips are assigned to enter Palmerae from roadways on the Ritz Carlton property, indicate this in Figure 10. Similarly, if traffic from Lincoln Drive to the west is anticipated to use Mockingbird Lane or Street A instead of continuing to Scottsdale Road, indicate this in Figure 10.
17. Page 33 - Include a graphic that shows the projected Ritz Carlton development daily site traffic on the area roadways.
18. Tables 9 & 10 – It is assumed that the non-mitigated capacity analyses have kept the basic signal timing and phase splits in place as much as possible since the mitigated analyses are noted to have optimized signal phase splits. Is this correct?
19. Tables 9 & 10 – Provide the signal timing output in the appendix that shows the phasing and timing used for analysis of signalized intersections.
20. Tables 9 & 10 – Why was the mitigated scenario for Scottsdale Road and Indian Bend Road, Scottsdale Road and 6750 North, and Scottsdale Road and Lincoln Drive intersections not analyzed in 2018?
21. Page 42 – “Intersection” is spelled wrong. If the signage and striping is recommended at these intersections then the developer should install it with the project. It’s not readily apparent where you would place the signage and crosshatching since these are not traditional “rectangular” intersections.
22. Page 49 - Refer to the City of Scottsdale Design Standards & Policies Manual Section 5-3.119 for turn lane criteria at intersections, and Section 5-3.206 for turn lanes at driveways.
23. Page 48-49 - Right-turn lanes at intersections are required to provide a minimum of 100 feet of storage. If the storage length of the southbound right-turn lane at 6750 North is reduced by the modification to the driveway, the right-turn lane should be modified accordingly.

24. Table 9 and Table 10 – Intersection of Scottsdale Plaza Resort Driveway and Indian Bend Road shows only two approaches in Table 9 and four approaches in Table 10. According to Figure 19, the geometry for this intersection is the same in both scenarios.
25. Table 12 – Several recommended storage lengths are less than the City’s minimum of 100 feet (150 feet preferred). New turn lanes along Scottsdale Road should provide 150 feet of storage.
26. Figure 20 – Does the 4-foot median width include the curb and gutter on both sides of the median leaving a raised portion of one-foot width?
27. What timing was used to analyze Saturday? The timing plans included in the appendix are for weekday AM and PM peak periods only.
28. Segment Capacity Analysis – The statement is made that the proposed development generates fewer daily trips on Scottsdale Road than the 2008 plan for Palmeraie despite generating more “new” daily trips. What changes in land use or roadway network have contributed to this?

Site Plan and General Comments:

1. The intersection volume numbers in all of the figures are difficult to read.
2. The City of Scottsdale Transportation staff is still not supporting dual northbound left-turns at the 6750 North and Scottsdale Road intersection. The capacity analyses need to assume a single left-turn lane for the intersection geometry. Comparative analysis can assume other proposed geometric options in an appendix. This intersection is spaced at a quarter mile distance from both Indian Bend Road and Lincoln Drive and should not bear the majority of the traffic load for the Ritz Carlton and Palmeraie development.
3. Assume dual northbound left-turn lanes at the Scottsdale Road and Indian Bend Road intersection for the capacity analyses. Other scenarios may be included in an appendix.
4. Provide a conceptual roadway plan for Indian Bend Road west of Scottsdale Road that includes two westbound through lanes.
5. Transportation staff is recommending that the retail portion of the site, the heaviest trip generator, be located at the northeast corner of the site adjacent to Indian Bend and Scottsdale Road. This will distribute more site traffic to Indian Bend Road, which is the major east-west roadway serving the site.
6. The internal street system must be designed to discourage traffic from using the 6750 North intersection to access the retail portion of the site. Street C must not connect the two phases of the development. This traffic should use Street A.
7. Please provide a full copy of the final approved Ritz Carlton traffic impact study.

1st Submittal Comment Responses

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer: Phil Kercher and Jon Bartlet, City of Scottsdale

Item	Location	Code Review Comment	Response
Comments:			
1.	p.11	1 Page 11 – Provide a 24-hour segment traffic volume for Lincoln Drive between Quail Run and Scottsdale Road in Table 2.	Updated TIMA now provides 24-hour segment traffic volumes at requested locations.
2.	p.16, Appendices	1 Page 16 – The paragraph on the collision experience is a bit confusing. It's not clear why the collisions would need to be gleaned from more than 100,000 collisions and why they are not from an official source. The City of Scottsdale will provide collision data upon request. Also, the collision data is contained in Appendix C, not Appendix D.	Text has been modified and the order of the appendices is corrected.
3.	p.18	1 Page 18 – Rear-end collisions are the most prevalent at signalized intersections. Before recommending that the Indian Bend and Scottsdale Road intersection should be further evaluated by City staff, provide some more data regarding the collision trends, such as whether the rear-end collisions are primarily on one approach or not.	The recommendation has been removed. Of the 17 rear end collisions, 7 were traveling northbound, 8 southbound, 1 eastbound and 1 westbound.
4.	p.19	1 Page 19 – Although there may be enough pavement width on Indian Bend at the Scottsdale Road intersection for a four lane approach, this is only because the curb return was set anticipating a four-lane cross section. There is only enough width for one lane 170 feet west of the crosswalk. This is not adequate for the appropriate storage and tapers, so the statement that needed lane configuration can be accomplished without modifying the roadway width is not correct.	This was intended to indicate that the half street improvements will tie into the intersection without modifying the curb returns, not that the future roadway would match the existing half-street width. Nevertheless, the report is updated per new proposed improvements for Indian Bend Road as per direction by Paul Basha.
5.	p.20&23	1 Page 20 and 23 – Retail Square footage on page 20 does not match the retail square footage in Table 7.	The report and analyses are now consider the updated site plan.
6.	p.21, 31, Appendix G	1 Page 21 – Include a full Ritz Carlton development site plan in addition to the Palmeriae site plan for reference.	The full Ritz Carlton development site plan is included within Appendix G as indicated on page 33.
7.	p.22	1 Page 22 – Phase 1 improvements need to include the widening of Indian Bend Road to accommodate site traffic.	The updated improvements are now proposed in Phase 1. Text has been updated accordingly.

Reviewed Date
 CivTech Received Date
 CivTech Entered Date
 CivTech Response Date

1st Submittal Comment Responses

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer: Phil Kercher and Jon Bartlet, City of Scottsdale

Item	Location	Code Review Comment	Response
8.	p.22, Appendix E	1 Page 22 - Provide documentation to support the 20 percent internal capture value.	Calculations using the ITE provided worksheet are included in Appendix E.
9.	p.23	1 Page 23 - The previous Palmeriae development did not complete the rezoning process; therefore, the trip generation of the proposed development should be compared to land uses allowed under existing zoning, not to the proposed land uses in the development plan from the 2008 application, which was not approved. Resort hotel land use was used for comparison in the 2008 traffic study.	The comparison to a 180-room hotel (as compared within the 2008 study) is now included in the TIMA.
10.	p.24, Figures 5- 8	1 Page 24 - The proposed trip distributions shown in Figures 5 – 8 for the various land uses are not acceptable. These appear to have been heavily weighted to Lincoln Drive, especially for the hotel distribution. The distributions do not appear to reflect how the roadway network is used today.	The trip distribution have been updated as requested.
11.	p.24	1 Page 24 – Table 8 percentages listed under each land use do not total 100 percent except for the office land use.	The trip distribution percentage have been updated.
12.	Figures 5- 10	1 Figures 5 – 8 - Does the traffic distribution to the Palmeriae site include traffic assigned to Street A or Mockingbird Lane between Indian Bend Road and Lincoln Drive? If so, include that in Figure 6. These figures should be for the Palmeriae site, not the Ritz Carlton site.	The Ritz Carlton intersections of Street A and Indian Bend Road and Quail Run Road within the Town of Paradise Valley are now included within the report.
13.	Figure 6	1 Figure 6 - The distribution of retail trips onto Mockingbird Lane accounts for over 900 daily trips. Is this realistic? Is this local traffic or traffic from the region routed through the local neighborhoods?	The trip distribution has been updated. Local traffic is indeed expected; however, the 5% applied previously was lowered to 2%.
14.	Figures 9- 18	1 Provide daily volumes on Indian Bend Road and Lincoln Drive east of Scottsdale Road on all traffic volume figures.	Updated TIMA now provides 24-hour segment traffic volumes at requested locations.
15.	Figures 9- 18	1 Figures 9 – 12 – Include the daily traffic volumes for Mockingbird Lane, Street A, Indian Bend Road west of the site, and Lincoln Drive west of the site.	Updated TIMA now provides 24-hour segment traffic volumes at requested locations.

Reviewed Date
 CivTech Received Date
 CivTech Entered Date
 CivTech Response Date

1st Submittal Comment Responses

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer: Phil Kercher and Jon Bartlet, City of Scottsdale

Item	Location	Code Review Comment	Response
16.	Figure 9-12	1 Figures 10 - The trip generation does not match the trip assignment in Figure 10. If new trips are assigned to enter Palmeriae from roadways on the Ritz Carlton property, indicate this in Figure 10. Similarly, if traffic from Lincoln Drive to the west is anticipated to use Mockingbird Lane or Street A instead of continuing to Scottsdale Road, indicate this in Figure 10.	Some trips are expected to use cross access through Ritz Carlton. The two intersections are now included within the report.
17.	p.33, Appendix G	1 Page 33 - Include a graphic that shows the projected Ritz Carlton development daily site traffic on the area roadways.	The projected Ritz Carlton development site traffic is included within Appendix G as indicated on page 33.
18.	p.40-41, 43-44	1 Tables 9 & 10 – It is assumed that the non-mitigated capacity analyses have kept the basic signal timing and phase splits in place as much as possible since the mitigated analyses are noted to have optimized signal phase splits. Is this correct?	Correct.
19.	Appendices	1 Tables 9 & 10 – Provide the signal timing output in the appendix that shows the phasing and timing used for analysis of signalized intersections.	Signal timing reports are now included within the appropriate appendices.
20.	p.40-44	1 Tables 9 & 10 – Why was the mitigated scenario for Scottsdale Road and Indian Bend Road, Scottsdale Road and 6750 North, and Scottsdale Road and Lincoln Drive intersections not analyzed in 2018?	In all cases where mitigation analysis was provided, the intersection operated at LOS D or better. No mitigation analysis was necessary for 2018 conditions. In the updated TIMA, a mitigated scenario is included in projected background conditions.
21.	p.42	1 Page 42 – “Intersection” is spelled wrong. If the signage and striping is recommended at these intersections then the developer should install it with the project. It’s not readily apparent where you would place the signage and crosshatching since these are not traditional “rectangular” intersections.	Typo has been corrected. Such improvements should be considered within the striping plan.
22.	p.48-49	1 Page 49 - Refer to the City of Scottsdale Design Standards & Policies Manual Section 5-3.119 for turn lane criteria at intersections, and Section 5-3.206 for turn lanes at driveways.	The recommendations have been updated accordingly.

Reviewed Date
 CivTech Received Date
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1st Submittal Comment Responses

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer: Phil Kercher and Jon Bartlet, City of Scottsdale

Item	Location	Code Review Comment	Response
23.	p.48-49	1 Page 48-49 -Right-turn lanes at intersections are required to provide a minimum of 100 feet of storage. If the storage length of the southbound right-turn lane at 6750 North is reduced by the modification to the driveway, the right-turn lane should be modified accordingly.	The recommendations have been updated accordingly.
24.	p.40-41, 43-44, Figure 19	1 Table 9 and Table 10 – Intersection of Scottsdale Plaza Resort Driveway and Indian Bend Road shows only two approaches in Table 9 and four approaches in Table 10. According to Figure 19, the geometry for this intersection is the same in both scenarios.	The LOS table and lane configuration figure are updated to present the proposed conditions.
25.	p.48	1 Table 12 – Several recommended storage lengths are less than the City's minimum of 100 feet (150 feet preferred). New turn lanes along Scottsdale Road should provide 150 feet of storage.	The recommendations have been updated accordingly.
26.	Figure 20	1 Figure 20 – Does the 4-foot median width include the curb and gutter on both sides of the median leaving a raised portion of one-foot width?	The 4 feet includes non-asphalt paved components of the median. Please note that this concept design is shown on an aerial photograph without surveyed distances.
27.	Appendix D	1 What timing was used to analyze Saturday? The timing plans included in the appendix are for weekday AM and PM peak periods only.	The timing sheets provide timings for midday operations. A Scottsdale staff member indicated that the signal timings during which the Saturday peak hour occurs uses those phase splits.
28.	p.46	1 Segment Capacity Analysis – The statement is made that the proposed development generates fewer daily trips on Scottsdale Road than the 2008 plan for Palmeriae despite generating more "new" daily trips. What changes in land use or roadway network have contributed to this?	Primary differences include existing (or most recent available) ADTs are less than ADTs considered existing in 2008 and a revised growth rate. These in addition to other influences are now discussed within the text.
Site Plan and General Comments:			
1.	General	1 The intersection volume numbers in all of the figures are difficult to read.	The volume figures are now displayed on 11X17 pages in a larger font size.

Reviewed Date
 CivTech Received Date
 CivTech Entered Date
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1st Submittal Comment Responses

Disposition Codes: (1) Will Comply (2) Will Evaluate (3) Delete Comment (4) Defer to Consultant/Owner

Reviewer: Phil Kercher and Jon Bartlet, City of Scottsdale

Item	Location	Code Review Comment	Response
2.	General	1/3 The City of Scottsdale Transportation staff is still not supporting dual northbound left-turns at the 6750 North and Scottsdale Road intersection. The capacity analyses need to assume a single left-turn lane for the intersection geometry. Comparative analysis can assume other proposed geometric options in an appendix. This intersection is spaced at a quarter mile distance from both Indian Bend Road and Lincoln Drive and should not bear the majority of the traffic load for the Ritz Carlton and Palmerae development.	Per subsequent discussions with the City of Scottsdale and er the direction of Paul Basha, the updated TIMA considers dual northbound left turns on Scottsdale Road approaching both Indian Bend Road and 6750 North. As dual northbound left turn lanes approaching 6750 North is proposed, its analysis is within the main body of the report. The alternative analysis, with a single northbound left turn lane at 6750 North is considered and labeled as the alternative analysis.
3.	General	1/3 Assume dual northbound left-turn lanes at the Scottsdale Road and Indian Bend Road intersection for the capacity analyses. Other scenarios may be included in an appendix.	See response to 'Site Plan and General Comments' comment 2.
4.	General	1 Provide a conceptual roadway plan for Indian Bend Road west of Scottsdale Road that includes two westbound through lanes.	This has been provided in subsequent discussions. The updated site plan is the product of decisions made at these discussions.
5.	General	1 Transportation staff is recommending that the retail portion of the site, the heaviest trip generator, be located at the northeast corner of the site adjacent to Indian Bend and Scottsdale Road. This will distribute more site traffic to Indian Bend Road, which is the major east-west roadway serving the site.	See response to 'Site Plan and General Comments' comment 2.
6.	General	1 The internal street system must be designed to discourage traffic from using the 6750 North intersection to access the retail portion of the site. Street C must not connect the two phases of the development. This traffic should use Street A.	See response to 'Site Plan and General Comments' comment 2.
7.	General	1 Please provide a full copy of the final approved Ritz Carlton traffic impact study.	Will be provided.

Reviewed Date
 CivTech Received Date
 CivTech Entered Date
 CivTech Response Date

APPENDIX B

EXISTING TRAFFIC COUNTS

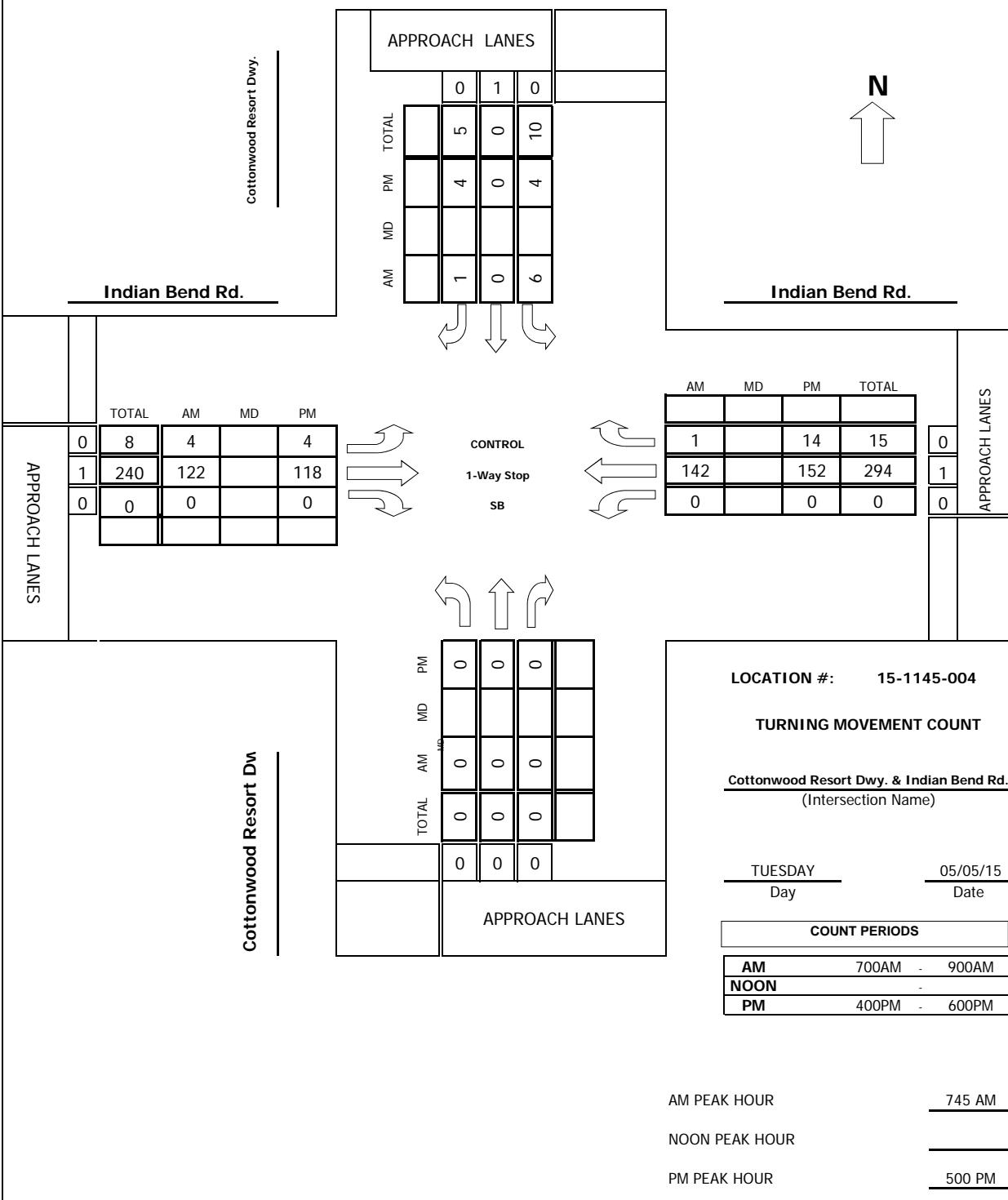
Intersection Turning Movement

Prepared by:



Project #: 15-1145-004

TMC SUMMARY OF Cottonwood Resort Dwy. & Indian Bend Rd.



Intersection Turning Movement

Prepared by:

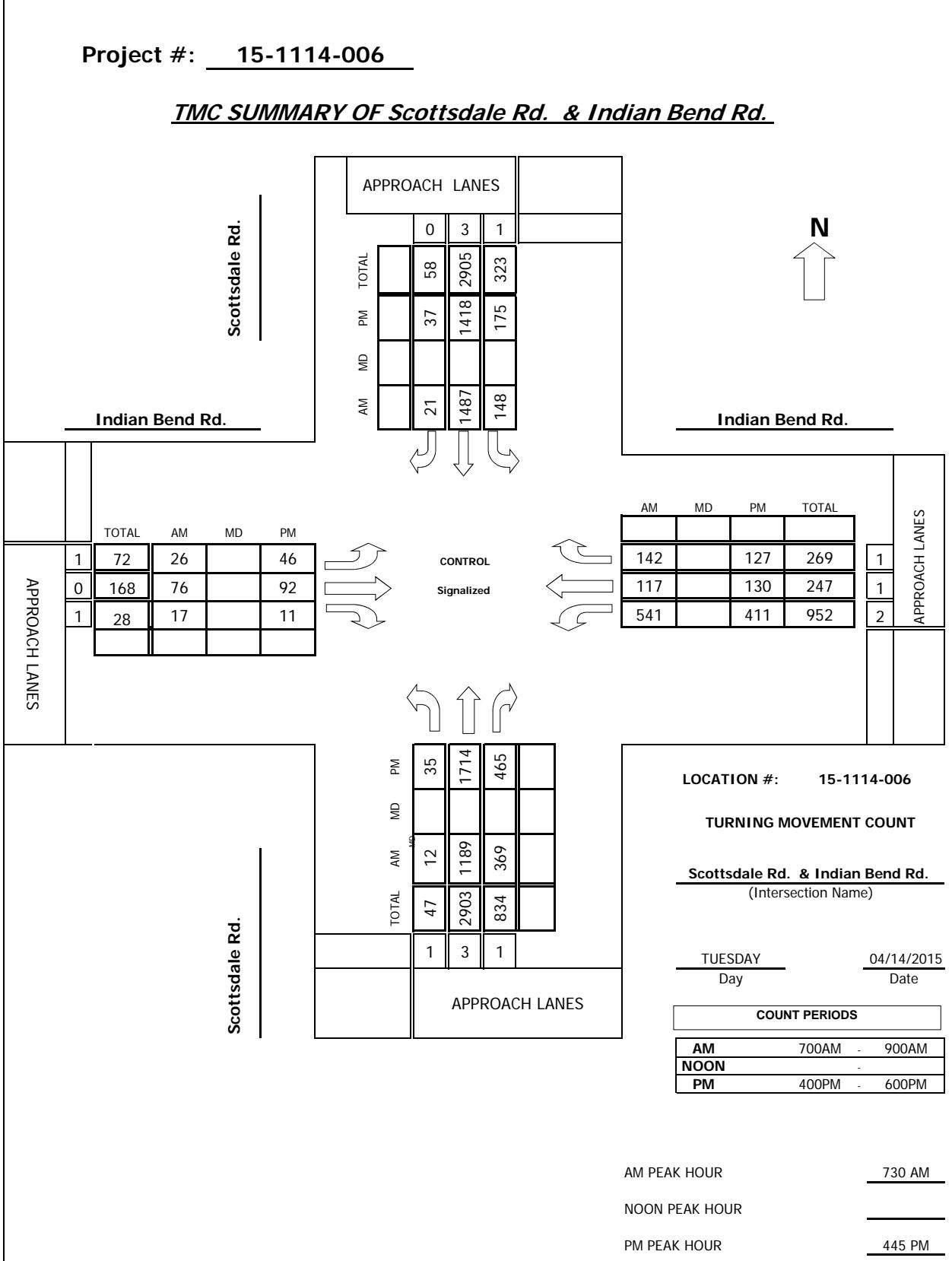


FIELD DATA SERVICES OF ARIZONA, INC.

520,316,674

Project #: 15-1114-006

TMC SUMMARY OF Scottsdale Rd. & Indian Bend Rd.



7-ZN-2016#2
8/11/2020

Intersection Turning Movement

Prepared by:

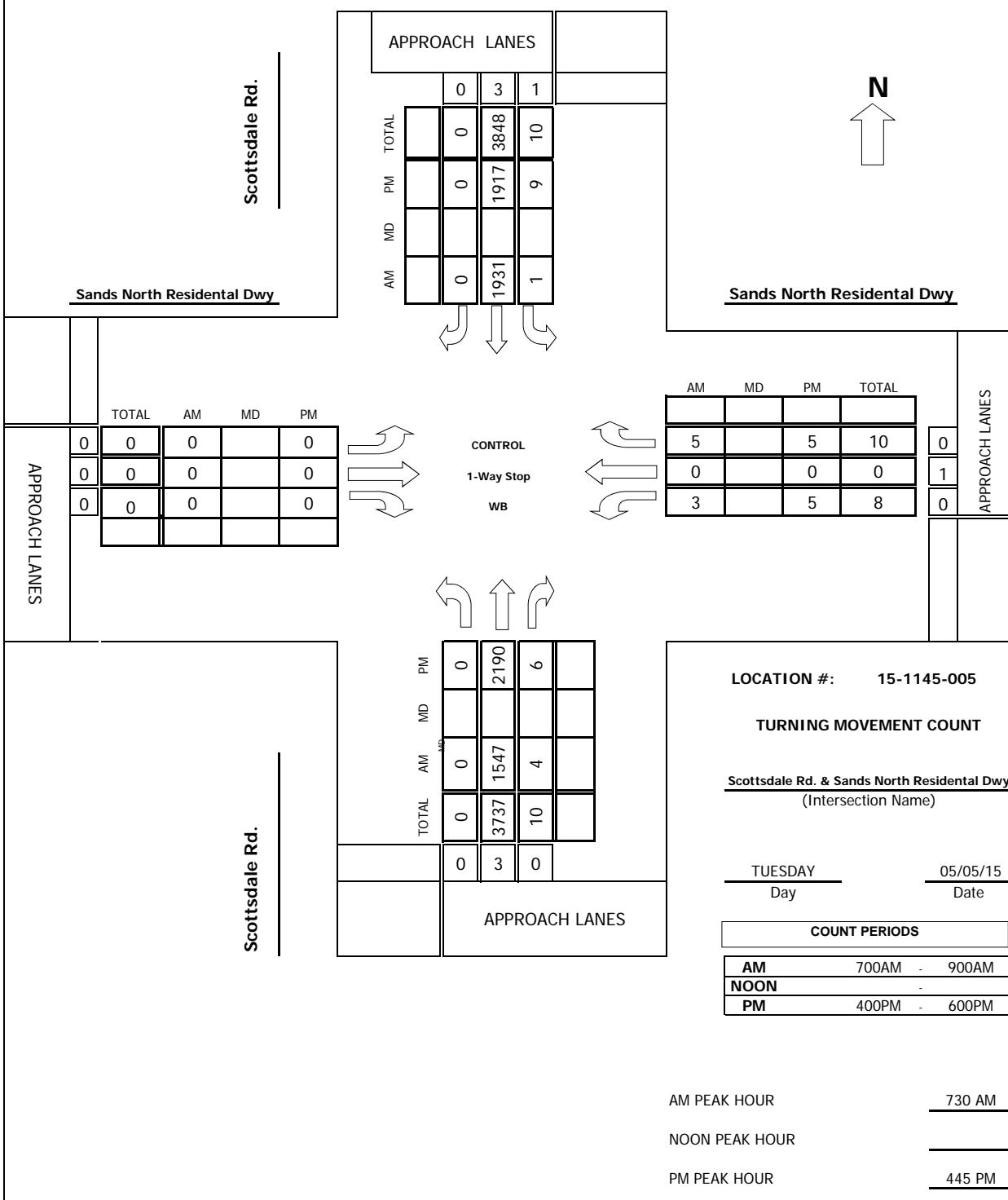


 FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

520,316,6745

Project #: 15-1145-005

TMC SUMMARY OF Scottsdale Rd. & Sands North Residential Dwy



Intersection Turning Movement

Prepared by:

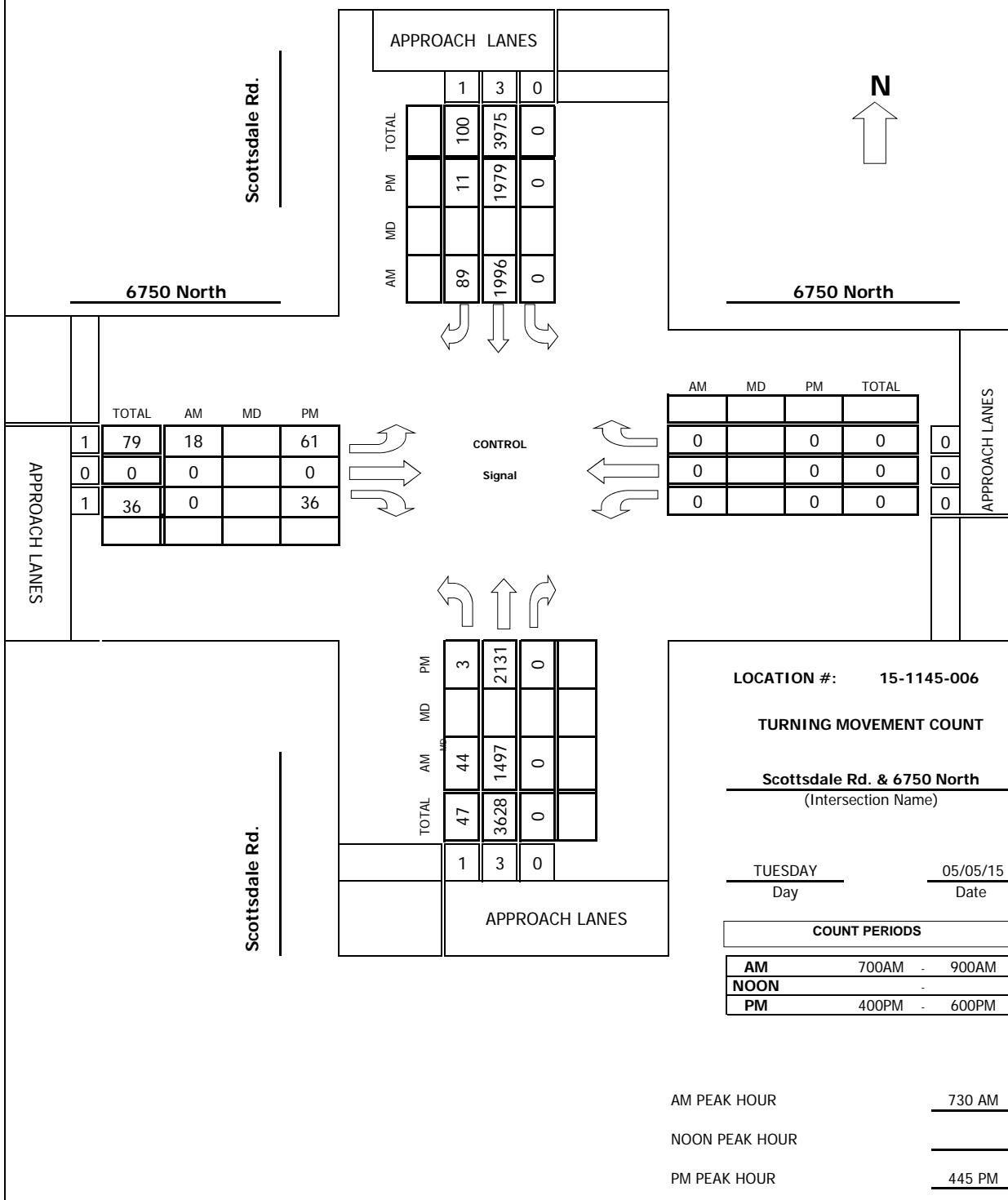


FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

520,316,674

Project #: 15-1145-006

TMC SUMMARY OF Scottsdale Rd. & 6750 North



Intersection Turning Movement

Prepared by:

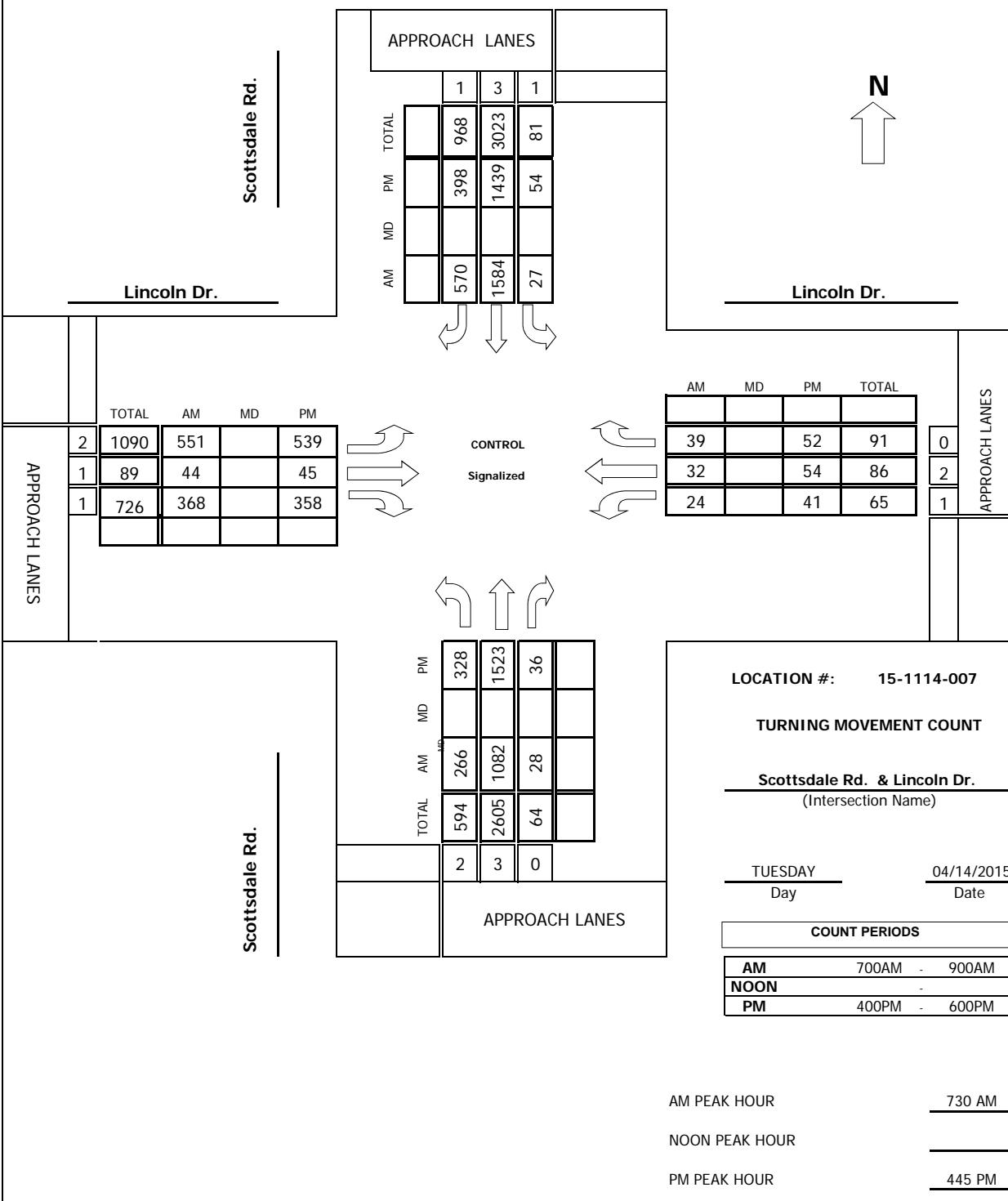


FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

520,316,674

Project #: 15-1114-007

TMC SUMMARY OF Scottsdale Rd. & Lincoln Dr.



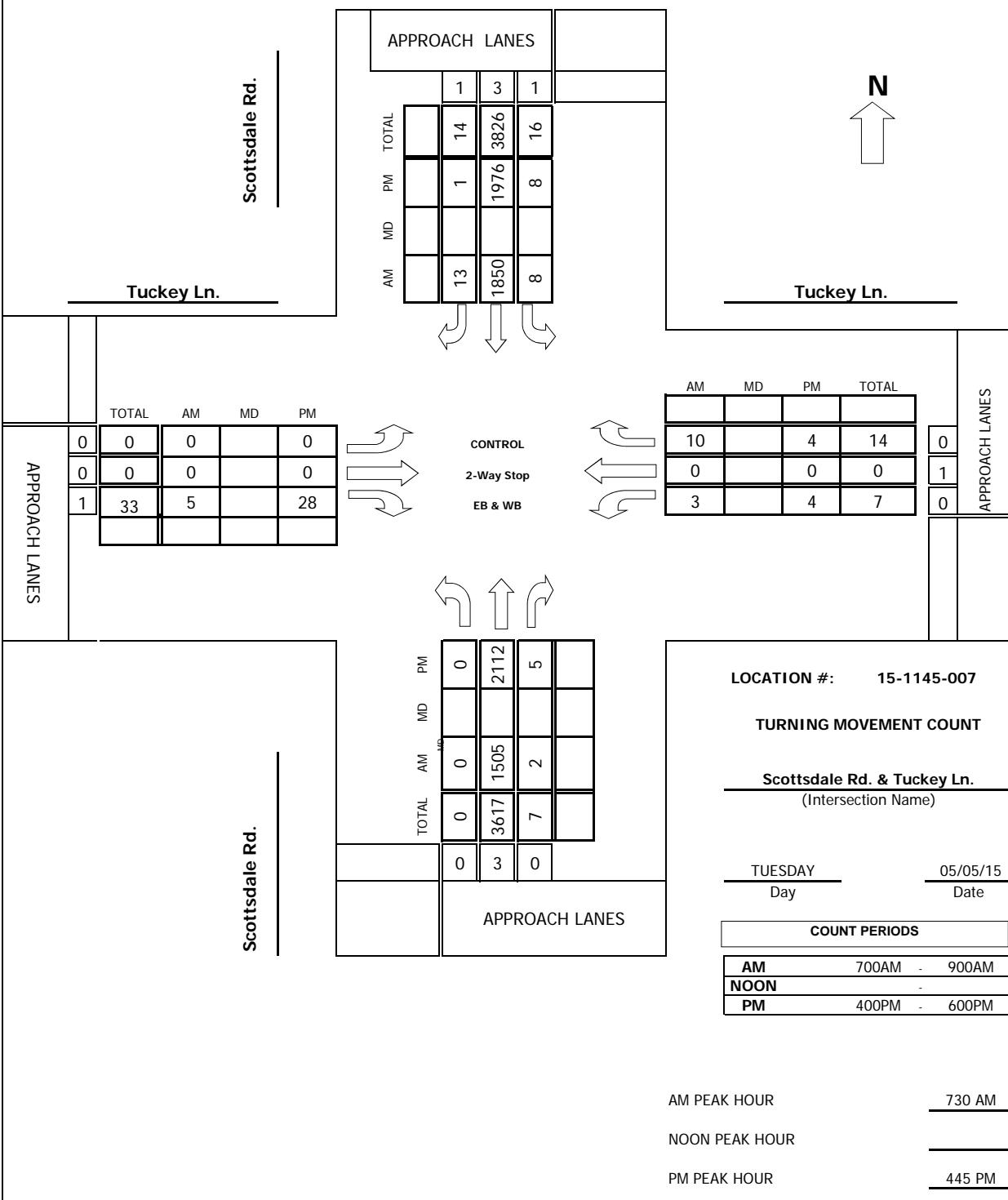
Intersection Turning Movement

Prepared by:



Project #: 15-1145-007

TMC SUMMARY OF Scottsdale Rd. & Tuckey Ln.



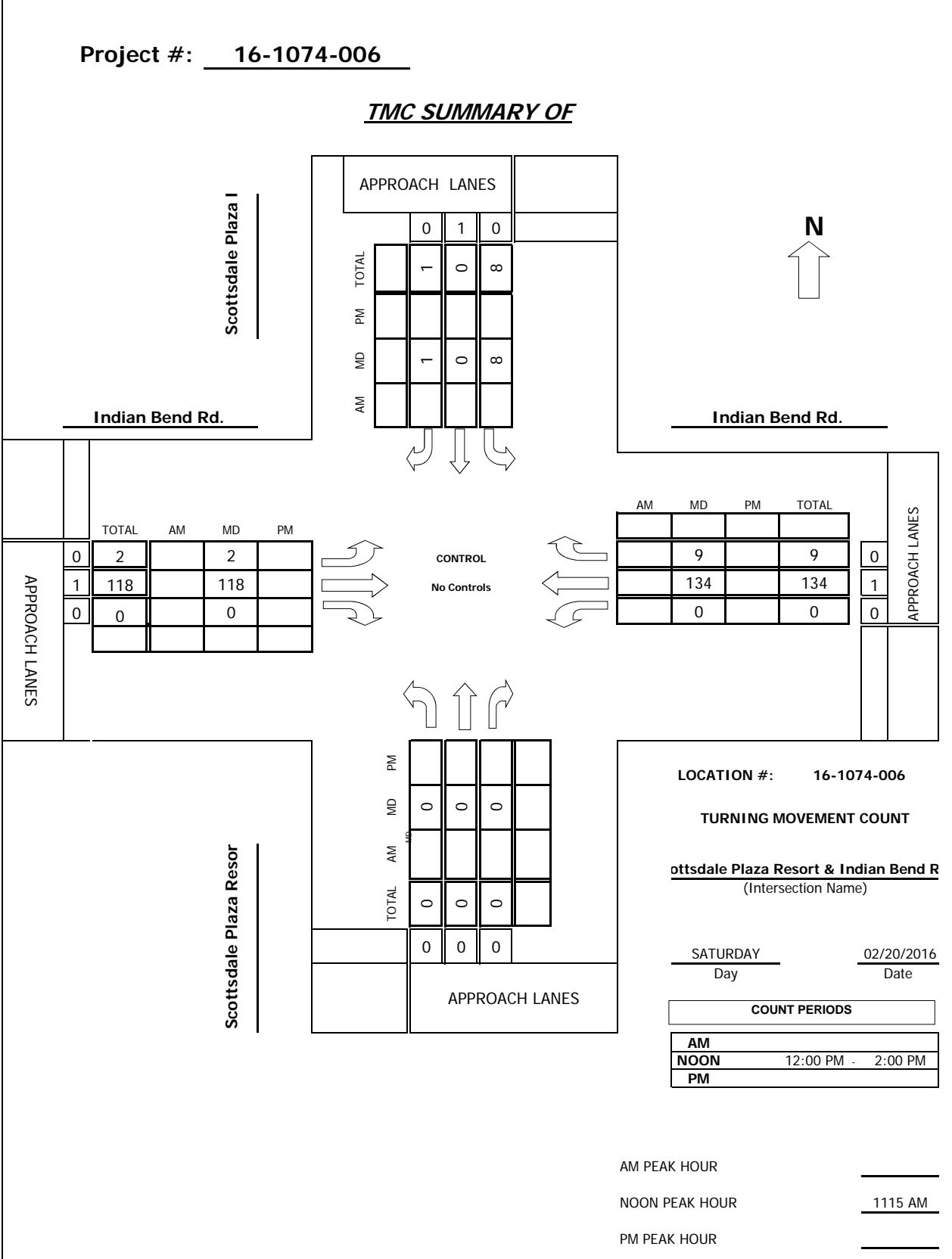
Intersection Turning Movement

Prepared by:



Project #: 16-1074-006

TMC SUMMARY OF



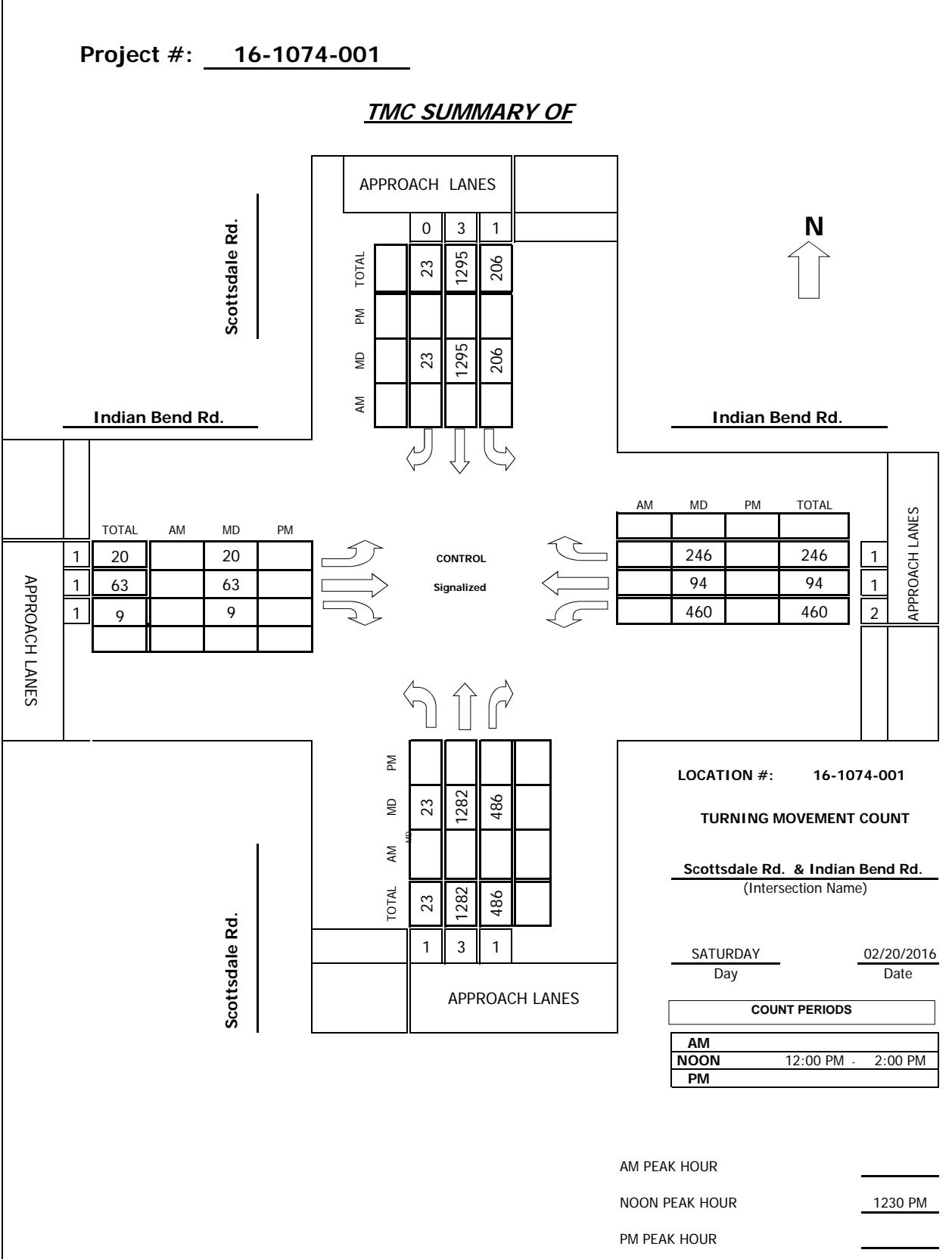
Intersection Turning Movement

Prepared by:



Project #: 16-1074-001

TMC SUMMARY OF



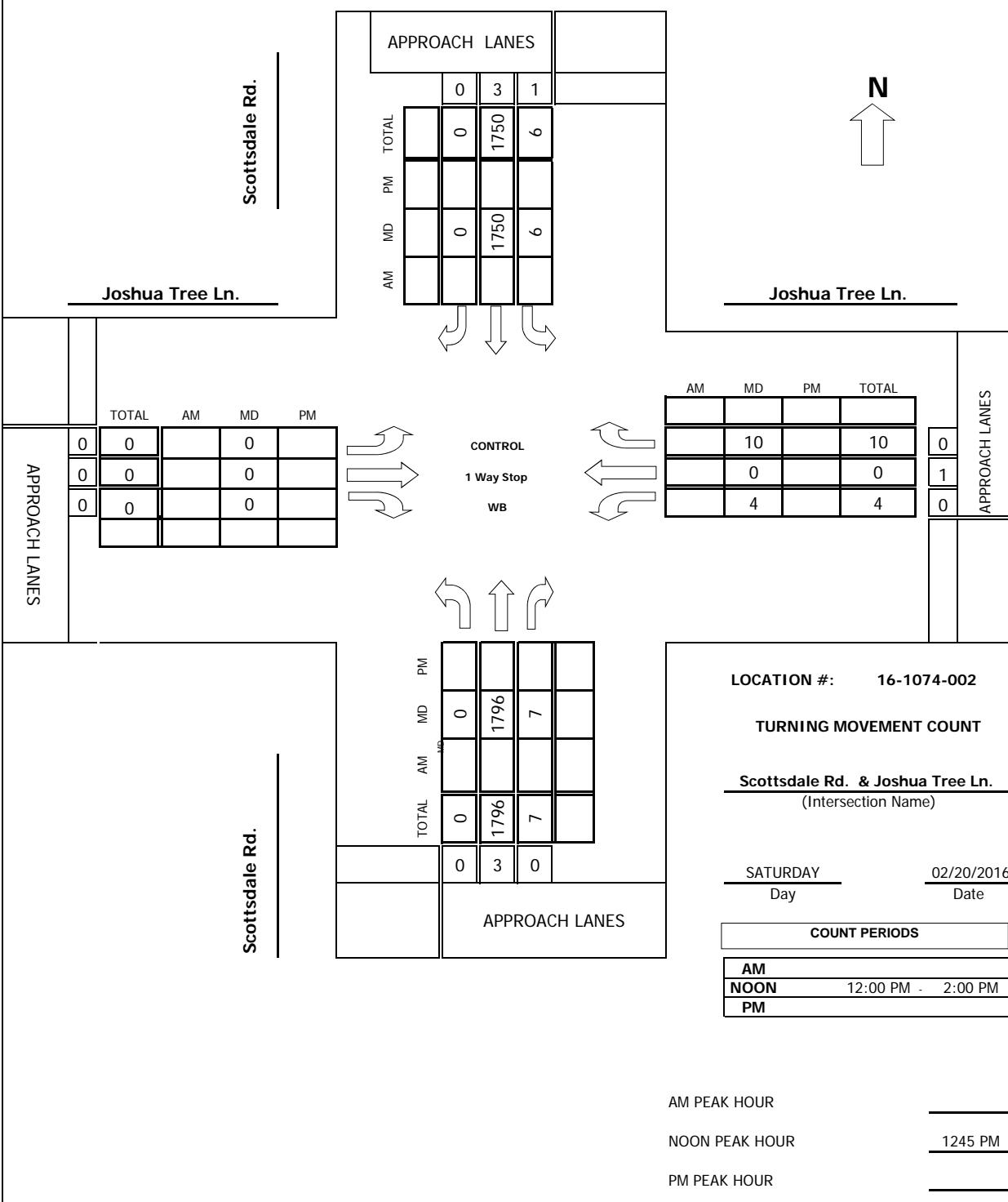
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Project #: 16-1074-002

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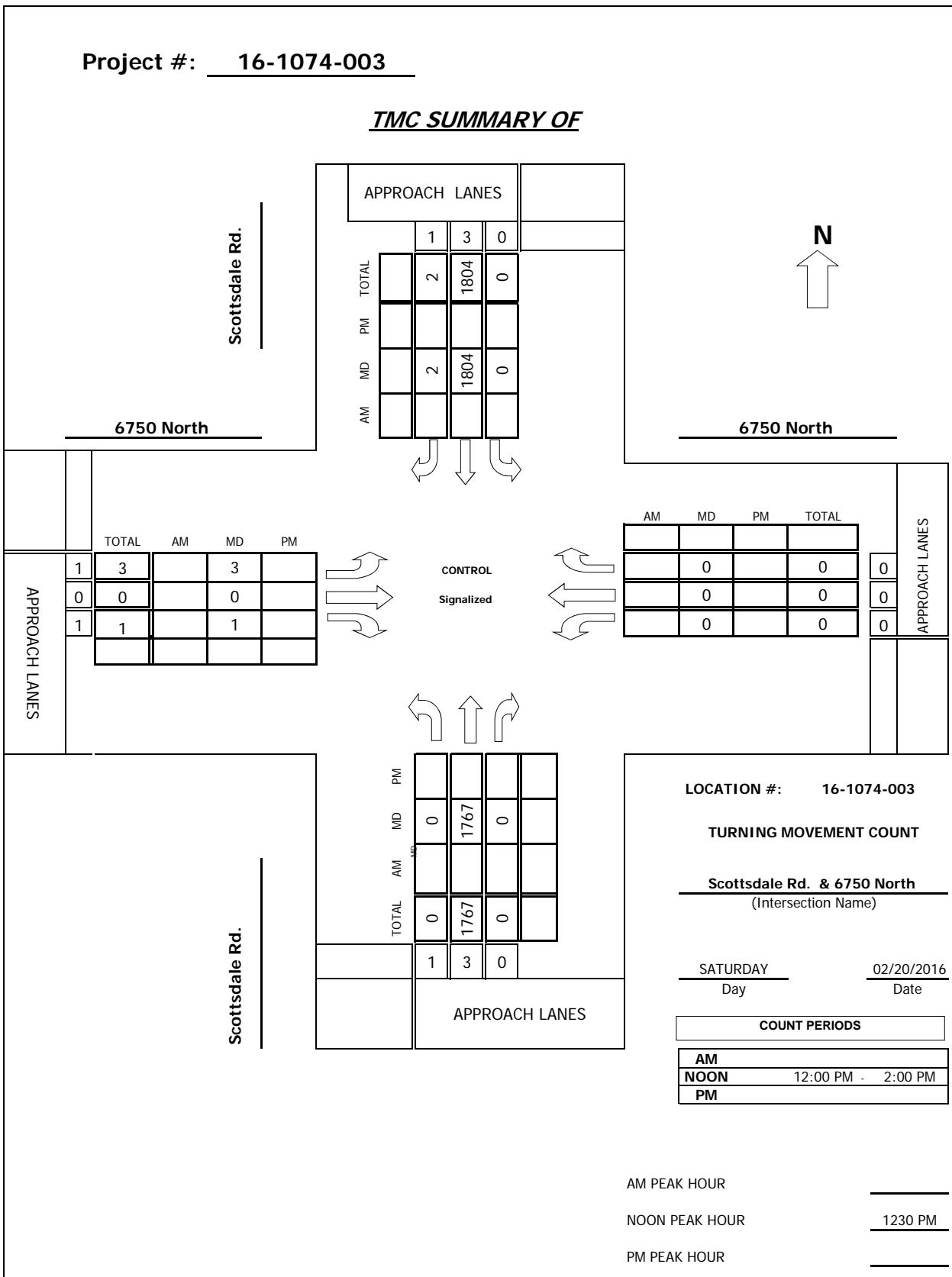


**Intersection Turning Movement
Prepared by:**

 **FIELD DATA SERVICES OF ARIZONA, INC.**
520.316.6745

Project #: 16-1074-003

TMC SUMMARY OF



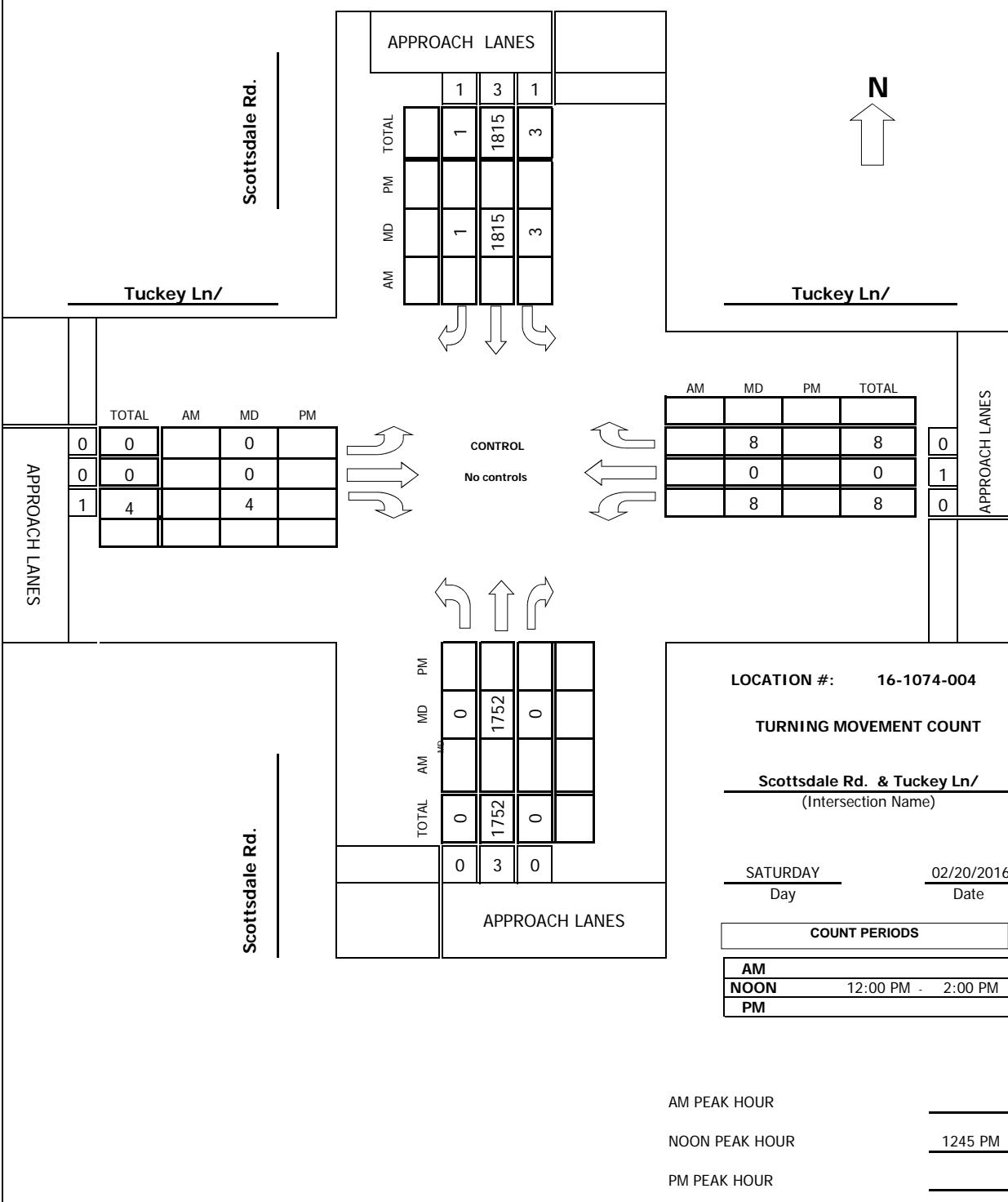
Intersection Turning Movement

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Project #: 16-1074-004

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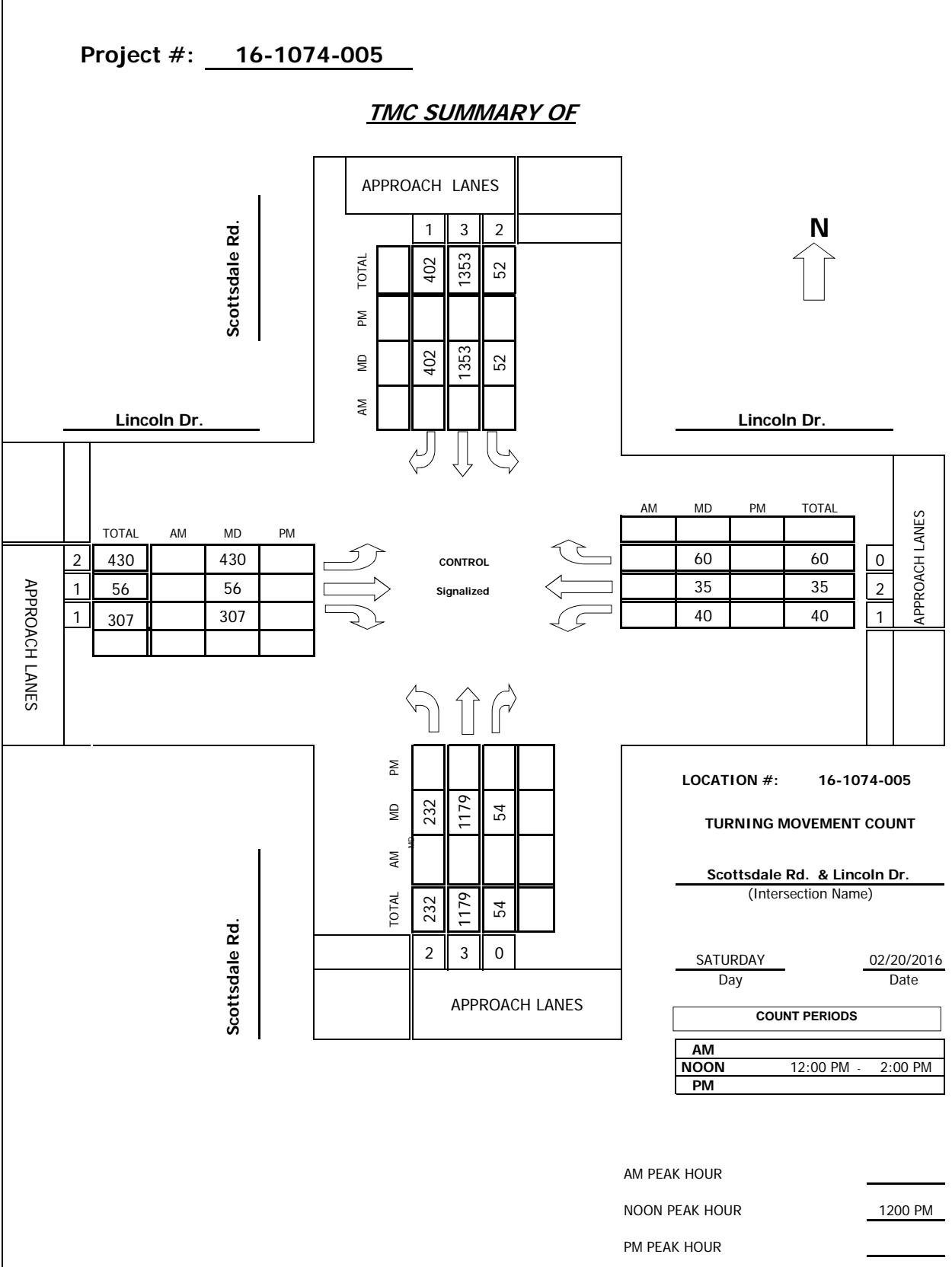
Intersection Turning Movement

Prepared by:



Project #: 16-1074-005

TMC SUMMARY OF





SCOTTSDALE RD. & INDIAN SCHOOL RD. BASIC TIMING

RECOMMENDED
CLEARANCES

F.D.W.	N/S 16	E/W 31	LEFT TURN STANDARD	DATE DESIGNED 3/15/2010	SYSTEM #	SECTION #
YELLOW	4.4	4.2	3.0			
ALL-RED	1.6	2.8	1.0	82	722	

COMMUNICATIONS I.P. ADDRESS

MM-1-5-1 172.17.10.82

TIMING #1 TIMING #2 TIMING #3 TIMING #4
CLEARANCE SEQUENCE PATTERNS HISTORY

MM-2-1
TIMING PLAN #1

GREENS

PEDESTRIAN

MAXIMUMS

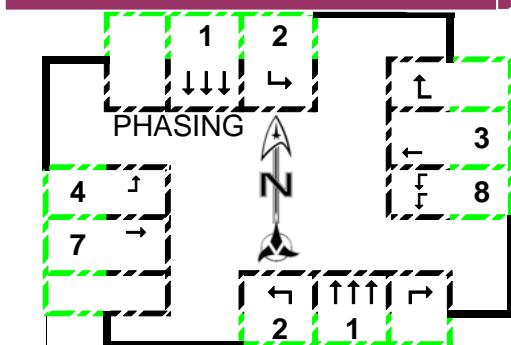
REDS

VOL DENSITY

MM-2-8

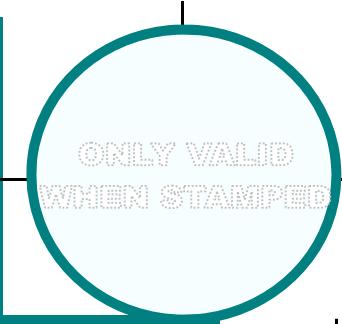
RECALLS

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MOVEMENT	NST	NST	WBT	EFL			EFL	WBT								
NOTES			perm/PROT		PROT				PROT							
MIN GRN	20	4	6	4			6	4								
BK MGRN																
CS MGRN																
DLY GRN																
WALK	7		7				7									
WALK2																
WLK MAX																
PED CLR/FDV	16		31				31									
PD CLR2																
PC MAX																
PED CO																
VEH EXT	0	1	2	1			1	1.5								
VH EXT2																
MAX 1	60	20	35	20			20	35								
MAX 2	70	30	40	35			40	40								
MAX 3																
DYM MAX																
DYM STP																
YELLOW	4.4	3	4.2	3			4.2	3								
RED CLR	1.6	1	2.8	1			2.8	1								
RED MAX																
RED RVT	2		2				2									
ACT B4																
SEC/ACT																
MAX INT																
TIME B4																
CARS WT																
STPTDUC																
TTREDUC																
MIN GAP																
LOCK DET																
VEH RECALL																
PED RECALL	X															
MAX RECALL																
SOFT RECALL																
NO REST																
ADD INIT CAL																



NOTES

Use Sequence #3 to Lead phs 4 & 7 and Lag phs 3 & 8





SCOTTSDALE RD. & INDIA COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	16	0	31	0	0	0	31	0
YELLOW	4.4	3.0	4.2	3.0	0.0	0.0	4.2	3.0
ALL RED	1.6	1.0	2.8	1.0	0.0	0.0	2.8	1.0

SYSTEM #

82

MORNING

EVENING

N/S EX

SECTION #

722

MID-DAY

MIDNIGHT

E/W EX

CLEARANCE

BASIC TIME

SEQUENCE

HISTORY

MM-3-3
MORNING
SPLIT
PATTERNS

TIMING PLAN #1

SEQUENCE #3

ACTION PLAN #

SEQUENCE

R1

R2

E/W

WALK &
GREEN

N/S

FDW &
GREEN

MM-3-2

AVAILABLE
COORDINATOR
PATTERN #s

PROGRESSION VALUES

DIR
CODE

COORD
DIR

B.O.G.
OFFSET

HYPERLINKS
TO MORNING
TIME-SPACE
DIAGRAMS



PLAN # 1

DATE EFFECTIVE

10/10/2012

OPERATIVE TIMES

0630-0900



PHASE
SPLIT

RING 1

RING 2

TARGET

COORD

RECALLS (V, P, Mx)

GREEN

55

16

33

16

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6

16

7

32

8

120

ACTUAL
CYCLE

RING 1

RING 2

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SCOTTSDALE RD. & INDIA COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	16	0	31	0	0	0	31	0
YELLOW	4.4	3.0	4.2	3.0	0.0	0.0	4.2	3.0
ALL RED	1.6	1.0	2.8	1.0	0.0	0.0	2.8	1.0

SYSTEM #

82

SECTION #

722

MORNING

EVENING

N/S EX

MID-DAY

MIDNIGHT

E/W EX

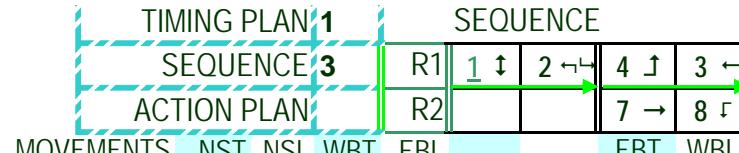
CLEARANCE

BASIC TIME

SEQUENCE

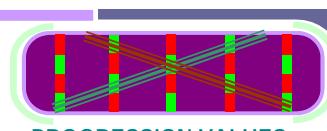
HISTORY

MM-3-3
EVENING
SPLIT
PATTERNS



MM-3-2

AVAILABLE COORDINATOR PATTERN #s



Hyperlinks to Evening Time-Space Diagrams

PLAN # 7
DATE EFFECTIVE
11/21/2006
OPERATIVE TIMES
1530-1830

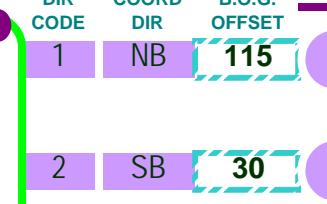
PHASE SPLIT

1	RING 1	2	3	4	5	RING 2	6	7	8	TARGET
57	18	27	18	57	18	18	18	11	23	120
COORD RECALLS (V, P, Mx)	X	P								ACTUAL CYCLE
GREEN	51	14	20	14	57	18	11	23		RING 1 RING 2



DIR CODE

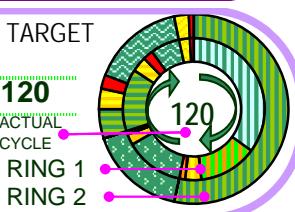
1	NB	115
2	SB	30
3	NS	30
4	EB	45
5	WB	45
6	EW	45



PLAN # 8
DATE EFFECTIVE
OPERATIVE TIMES

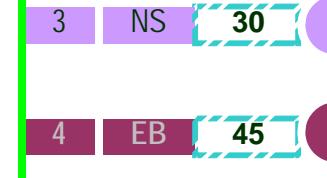
PHASE SPLIT

1	RING 1	2	3	4	5	RING 2	6	7	8	TARGET
64	20	24	12	64	20	20	13	23	120	ACTUAL CYCLE
COORD RECALLS (V, P, Mx)	X	P								RING 1 RING 2
GREEN	58	16	17	8	64	20	6	19		



DIR CODE

8 1	8 2	8 3	8 4	8 5	8 6
-----	-----	-----	-----	-----	-----



PLAN # 9
DATE EFFECTIVE
OPERATIVE TIMES

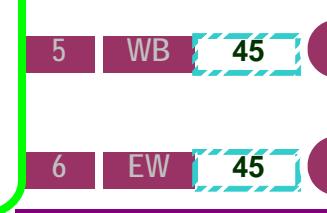
PHASE SPLIT

1	RING 1	2	3	4	5	RING 2	6	7	8	TARGET
54	16	29	21	54	16	21	29	120	ACTUAL CYCLE	
COORD RECALLS (V, P, Mx)	X	P								RING 1 RING 2
GREEN	48	12	22	17	54	16	14	25		



DIR CODE

9 1	9 2	9 3	9 4	9 5	9 6
-----	-----	-----	-----	-----	-----





SCOTTSDALE RD. & SP BASIC TIMING

RECOMMENDED
CLEARANCES

	N/S	E/W	LEFT TURN STANDARD	DATE DESIGNED
F.D.W.	6	22		11/17/2010
YELLOW	4.9	3.2	3.0	SYSTEM #
ALL-RED	1.1	3.8	1.0	SECTION #
				209 722

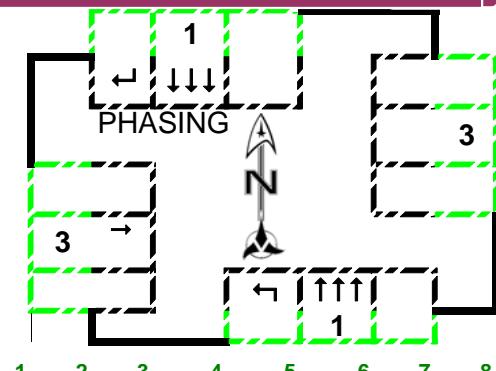
COMMUNICATIONS I.P. ADDRESS

MM-1-5-1 172.17.12.09

TIMING #1 TIMING #2 TIMING #3 TIMING #4
CLEARANCE SEQUENCE PATTERNS HISTORY

MM-2-1
TIMING PLAN #1

MOVEMENT	PHASE		1	3	EWT	NOTES	9	10	11	12	13	14	15	16
	INST	INST												
MIN GRN	10			5										
BK MGRN														
CS MGRN														
DLY GRN														
WALK	20			8										
WALK2														
WLK MAX														
PED CLR/FDV	10			22										
PD CLR2														
PC MAX														
PED CO														
VEH EXT				2										
VH EXT2														
MAX 1	95			30										
MAX 2	100			45										
MAX 3														
DYM MAX														
DYM STP														
YELLOW	4.9			2.8										
RED CLR	1.1			3.2										
RED MAX														
RED RVT	2			2										
ACT B4														
SEC/ACT														
MAX INT														
TIME B4														
CARS WT														
STPTDUC														
TTREDUC														
MIN GAP														
LOCK DET														
VEH RECALL														
PED RECALL	X													
MAX RECALL														
SOFT RECALL														
NO REST														
ADD INIT CAL														



NOTES

ONLY VALID
WHEN STAMPED



SCOTTSDALE RD. & SPI COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	10	0	22	0	0	0	0	0
YELLOW	4.9	0.0	2.8	0.0	0.0	0.0	0.0	0.0
ALL RED	1.1	0.0	3.2	0.0	0.0	0.0	0.0	0.0

SYSTEM #

209

MORNING

EVENING

N/S EX

SECTION #

722

MID-DAY

MIDNIGHT

E/W EX

CLEARANCE

BASIC TIME

SEQUENCE

HISTORY

MM-3-3
MORNING
SPLIT
PATTERNS

TIMING PLAN #1

SEQUENCE #1

ACTION PLAN #

SEQUENCE

R1

R2

1 ↴

3 ↪

→

MOVEMENTS

NST

EWT

E/W

N/S

WALK &
GREEN

FDW &
GREEN

GREEN

w/o WALK

LEFT

PLAN # 1

DATE EFFECTIVE

11/20/2006

OPERATIVE TIMES

0630-0900

PHASE

SPLIT

COORD

RECALLS (V, P, Mx)

GREEN

1

2

3

4

5

RING 1

6

7

8

RING 2

7

8

9

TARGET

120

ACTUAL CYCLE

RING 1

RING 2

COORD DIR

X

P

DIR CODE

RECALLS (V, P, Mx)

RECALS (V, P, Mx)

GREEN

89

0

19

0

0

0

0

0

0

0

120

ACTUAL CYCLE

RING 1

RING 2

11

12

13

14

15

16

21

22

23

24

25

26

31

32

33

34

35

36

41

42

43

44

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210

211

212

213

214

215

216

217

218

219



SCOTTSDALE RD. & SPI COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	10	0	22	0	0	0	0	0
YELLOW	4.9	0.0	2.8	0.0	0.0	0.0	0.0	0.0
ALL RED	1.1	0.0	3.2	0.0	0.0	0.0	0.0	0.0

SYSTEM #

209

MORNING

EVENING

N/S EX

SECTION #

722

MID-DAY

MIDNIGHT

E/W EX

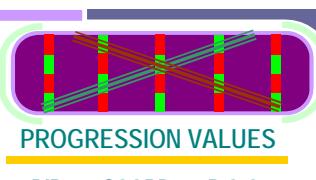
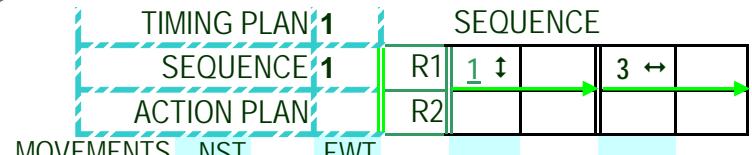
CLEARANCE

BASIC TIME

SEQUENCE

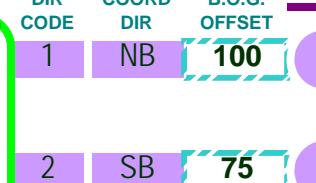
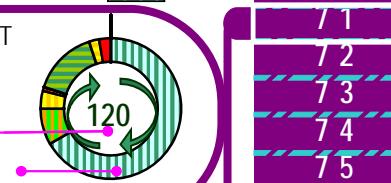
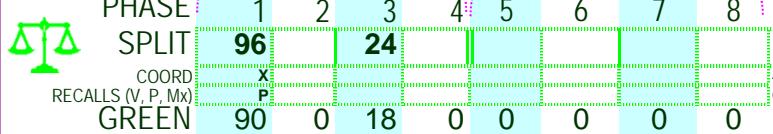
HISTORY

MM-3-3
EVENING
SPLIT
PATTERNS

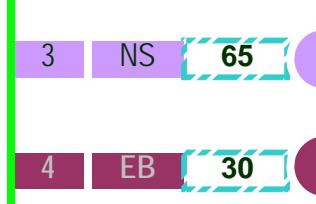
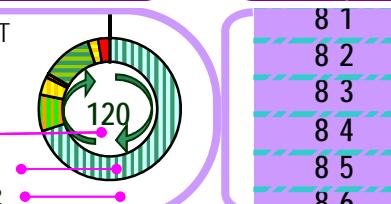
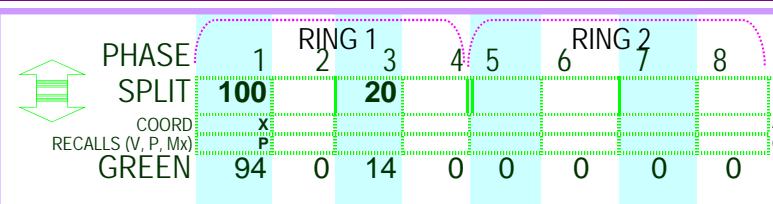


Hyperlinks
to Evening
Time-Space
Diagrams

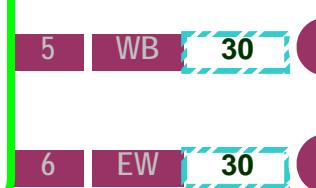
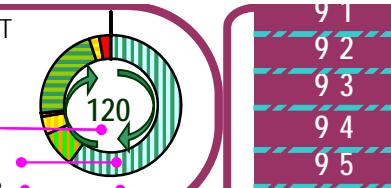
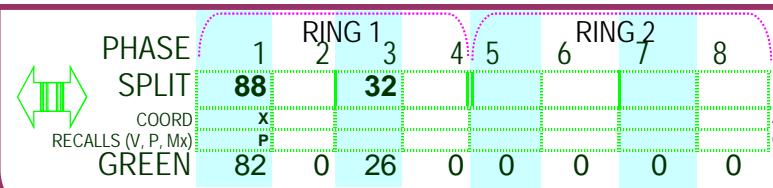
PLAN # 7
DATE EFFECTIVE
1/0/1900
OPERATIVE TIMES
1530-1830



PLAN # 8
DATE EFFECTIVE
OPERATIVE TIMES



PLAN # 9
DATE EFFECTIVE
OPERATIVE TIMES





SCOTTSDALE RD. & LINC BASIC TIMING

RECOMMENDED
CLEARANCES

F.D.W.	N/S 15	E/W 26	LEFT TURN STANDARD	DATE DESIGNED 4/20/2010	SYSTEM #	SECTION #
YELLOW	4.5	4	3.0			
ALL-RED	1.5	3	1.0	80	722	

COMMUNICATIONS I.P. ADDRESS

MM-1-5-1 **172.17.10.80**

TIMING #1 TIMING #2 TIMING #3 TIMING #4
CLEARANCE SEQUENCE PATTERNS HISTORY

MM-2-1
TIMING PLAN #1

GREENS

PEDESTRIAN

MAXIMUMS

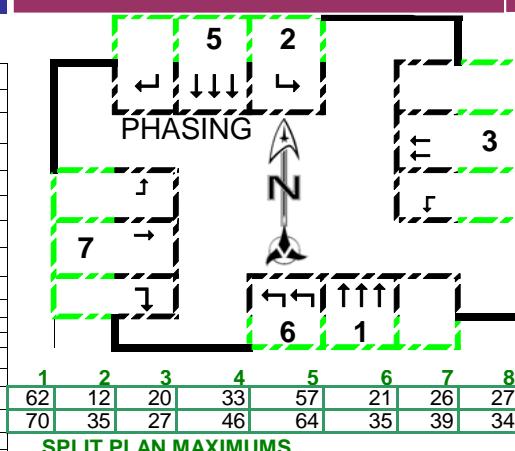
REDS

VOL DENSITY

MM-2-8

RECALLS

PHASE	1	2	3	4	5	6	7	9	10	11	12	13	14	15	16
MOVEMENT	NBT	SBL	WBT		SBT	NBL	EBT								
NOTES				Th&Lt											
MIN GRN	20	5	5		20	5	8								
BK MGRN															
CS MGRN															
DLY GRN															
WALK	7		7		7		7								
WALK2															
WLK MAX															
PED CLR/FDV	15		26		15		26								
PD CLR2															
PC MAX															
PED CO															
VEH EXT	0	1	2		0	1	2								
VH EXT2															
MAX 1	65	15	20		60	20	30								
MAX 2	70	35	30		65	35	40								
MAX 3															
DYM MAX															
DYM STP															
YELLOW	4.5	3	4		4.5	3	4								
RED CLR	1.5	1	3		1.5	1	3								
RED MAX															
RED RVT	2		2		2		2								
ACT B4															
SEC/ACT															
MAX INT															
TIME B4															
CARS WT															
STPTDUC															
TTREDUC															
MIN GAP															
LOCK DET															
VEH RECALL															
PED RECALL	X			X											
MAX RECALL															
SOFT RECALL															
NO REST															
ADD INIT CAL															



NOTES
PHASES 3 & 7
ARE
EXCLUSIVE





SCOTTSDALE RD. & LINC COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	15	0	26	0	15	0	26	0
YELLOW	4.5	3.0	4.0	0.0	4.5	3.0	4.0	0.0
ALL RED	1.5	1.0	3.0	0.0	1.5	1.0	3.0	0.0

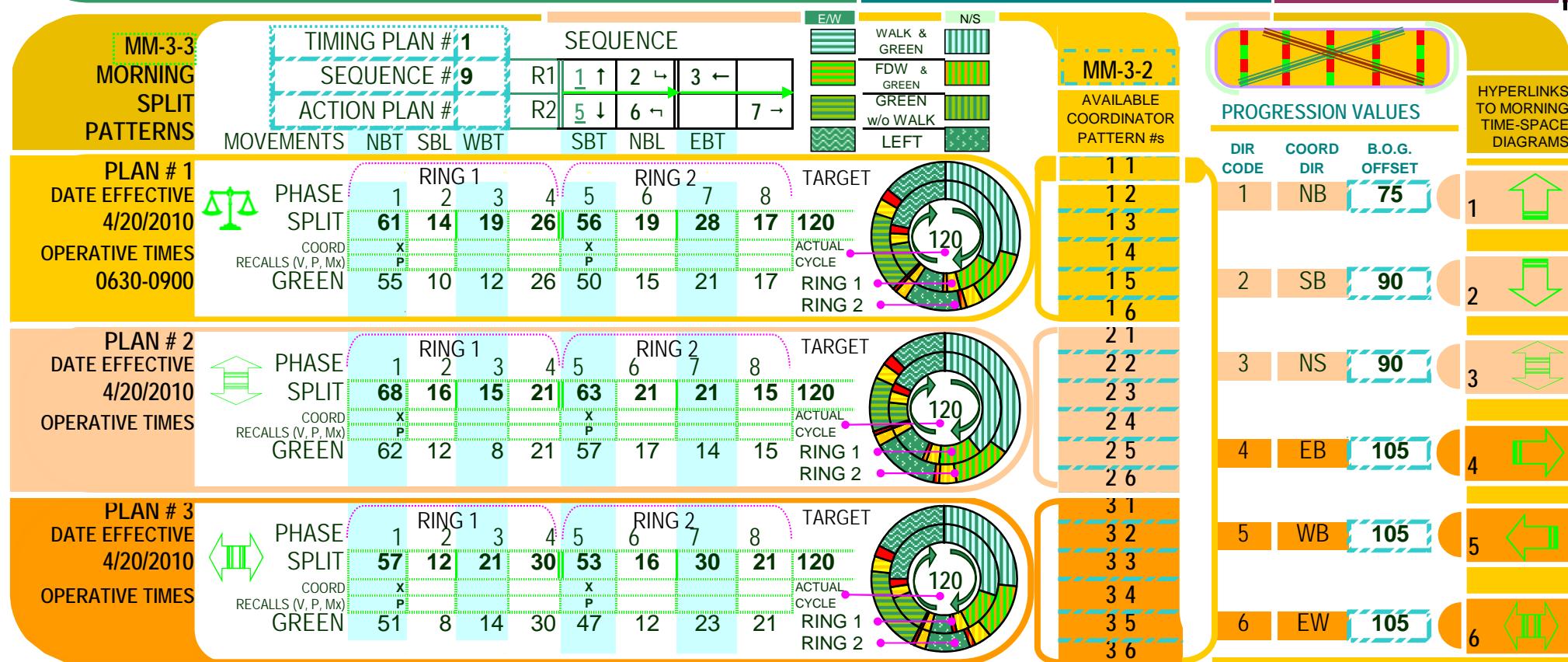
SYSTEM #

80

SECTION #

722

CLEARANCE BASIC TIME SEQUENCE HISTORY





SCOTTSDALE RD. & LINC COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	15	0	26	0	15	0	26	0
YELLOW	4.5	3.0	4.0	0.0	4.5	3.0	4.0	0.0
ALL RED	1.5	1.0	3.0	0.0	1.5	1.0	3.0	0.0

SYSTEM #

80

SECTION #

722

MORNING

MID-DAY

NIGHT

EVENING

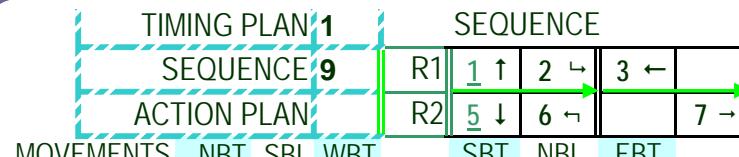
MIDNIGHT

E/W EX

N/S EX

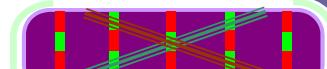
E/W EX

MM-3-3
EVENING
SPLIT
PATTERNS



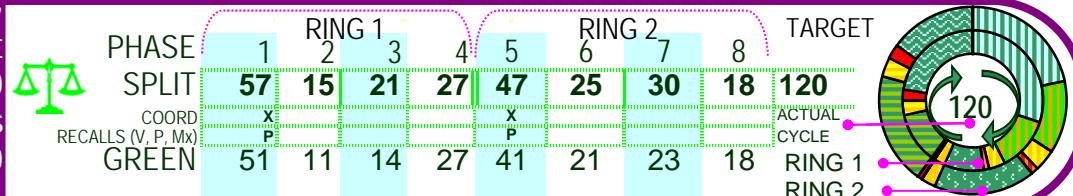
MM-3-2

AVAILABLE COORDINATOR PATTERN #s



Hyperlinks to Evening Time-Space Diagrams

PLAN # 7
DATE EFFECTIVE
4/20/2010
OPERATIVE TIMES
1530-1830

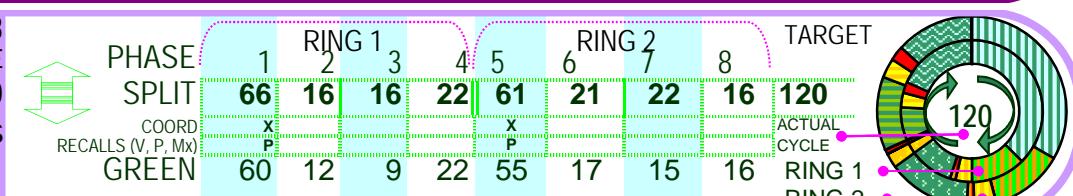


7 1
7 2
7 3
7 4
7 5
7 6

PROGRESSION VALUES

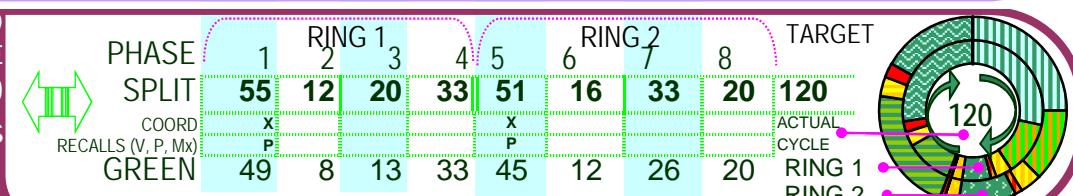
DIR CODE	COORD DIR	B.O.G. OFFSET
1	NB	75
2	SB	90
3	NS	90
4	EB	3
5	WB	3
6	EW	3

PLAN # 8
DATE EFFECTIVE
4/20/2010
OPERATIVE TIMES



8 1
8 2
8 3
8 4
8 5
8 6

PLAN # 9
DATE EFFECTIVE
4/20/2010
OPERATIVE TIMES



9 1
9 2
9 3
9 4
9 5
9 6



SCOTTSDALE RD. & McDRD BASIC TIMING

RECOMMENDED
CLEARANCES

F.D.W.	N/S 16	E/W 24	LEFT TURN STANDARD	DATE DESIGNED 3/15/2010	SYSTEM # 73	SECTION # 721
YELLOW	4.5	4.3	3.0			
ALL-RED	1.5	2.7	1.0			

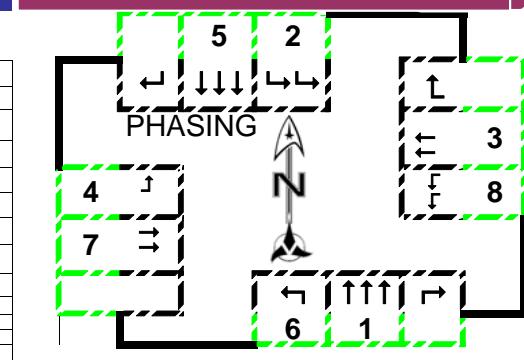
COMMUNICATIONS I.P. ADDRESS

MM-1-5-1 172.17.10.73

TIMING #1 TIMING #2 TIMING #3 TIMING #4
CLEARANCE SEQUENCE PATTERNS HISTORY

MM-2-1
TIMING PLAN #1

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MOVEMENT	NBT	SBL	WBT	EBL	SBT	NBL	EBC	WBL								
NOTES																
MIN GRN	20	10	8	6	20	10	8	6								
BK MGRN																
CS MGRN																
DLY GRN																
WALK	9		6		9		6									
WALK2																
WLK MAX																
PED CLR/FDV	16	24	16	24												
PD CLR2																
PC MAX																
PED CO																
VEH EXT	0	1	2	1	0	1	2	1								
VH EXT2																
MAX 1	55	20	40	20	55	20	40	20								
MAX 2	65	35	45	30	65	35	45	30								
MAX 3																
DYM MAX																
DYM STP																
YELLOW	4.5	3	4.3	3	4.5	3	4.3	3								
RED CLR	1.5	1	2.7	1	1.5	1	2.7	1								
RED MAX																
RED RVT	2		2		2		2									
ACT B4																
SEC/ACT																
MAX INT																
TIME B4																
CARS WT																
STPTDUC																
TTREDUC																
MIN GAP																
LOCK DET																
VEH RECALL																
PED RECALL																
MAX RECALL	X				X											
SOFT RECALL																
NO REST																
ADD INIT CAL																



SPLIT PLAN MAXIMUMS

1	2	3	4	5	6	7	8
52	20	29	17	52	20	29	17
64	35	44	39	64	35	44	39

NOTES

ONLY VALID
WHEN STAMPED



SCOTTSDALE RD. & McDC COORDINATOR

CLEARANCES

	PH1	2	3	4	5	6	7	8
FDW	16	0	24	0	16	0	24	0
YELLOW	4.5	3.0	4.3	3.0	4.5	3.0	4.3	3.0
ALL RED	1.5	1.0	2.7	1.0	1.5	1.0	2.7	1.0

SYSTEM #

73

SECTION #

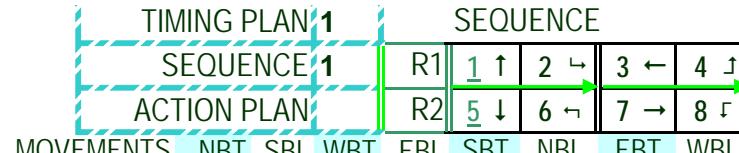
721

MORNING EVENING N/S EX

MID-DAY MIDNIGHT E/W EX

CLEARANCE BASIC TIME SEQUENCE HISTORY

MM-3-3
EVENING
SPLIT
PATTERNS



MM-3-2

AVAILABLE COORDINATOR PATTERN #s

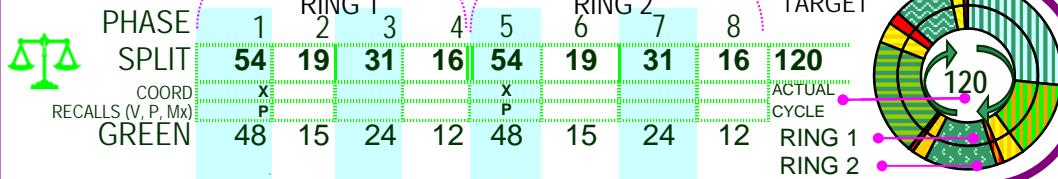
7 1
7 2
7 3
7 4
7 5
7 6

PROGRESSION VALUES

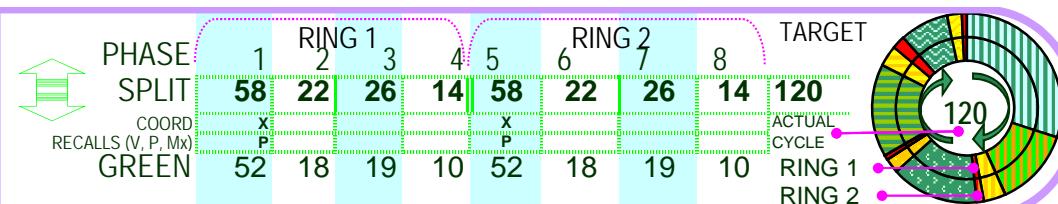
DIR CODE	COORD DIR	B.O.G. OFFSET
1	NB	35
2	SB	25
3	NS	30
4	EB	35
5	WB	35
6	EW	35

HYPERLINKS
TO EVENING
TIME-SPACE
DIAGRAMS

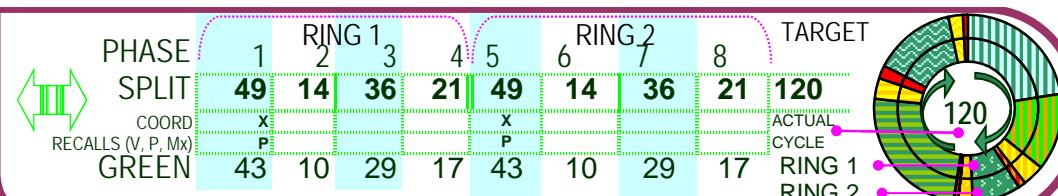
PLAN # 7
DATE EFFECTIVE
1/0/1900
OPERATIVE TIMES
1530-1830



PLAN # 8
DATE EFFECTIVE
OPERATIVE TIMES



PLAN # 9
DATE EFFECTIVE
OPERATIVE TIMES



APPENDIX C

EXISTING PEAK HOUR ANALYSIS

HCM 2010 TWSC
3: Indian Bend Rd. & Scottsdale Plaza Resort

7/22/2016

Intersection																
Int Delay, s/veh	0.3															
Movement	EBL	EBT	WBT	WBR	SBL	SBR										
Vol, veh/h	4	122		142	1	6	1									
Conflicting Peds, #/hr	0	0		0	0	0	0									
Sign Control	Free	Free		Free	Free	Stop	Stop									
RT Channelized	-	None		-	None	-	None									
Storage Length	-	-		-	-	0	-									
Veh in Median Storage, #	-	0		0	-	0	-									
Grade, %	-	0		0	-	0	-									
Peak Hour Factor	92	92		92	92	92	92									
Heavy Vehicles, %	2	2		2	2	2	2									
Mvmt Flow	4	133		154	1	7	1									
Major/Minor	Major1		Major2		Minor2											
Conflicting Flow All	155	0		-	0	296	155									
Stage 1	-	-		-	-	155	-									
Stage 2	-	-		-	-	141	-									
Critical Hdwy	4.12	-		-	-	6.42	6.22									
Critical Hdwy Stg 1	-	-		-	-	5.42	-									
Critical Hdwy Stg 2	-	-		-	-	5.42	-									
Follow-up Hdwy	2.218	-		-	-	3.518	3.318									
Pot Cap-1 Maneuver	1425	-		-	-	695	891									
Stage 1	-	-		-	-	873	-									
Stage 2	-	-		-	-	886	-									
Platoons blocked, %	-	-		-	-	-	-									
Mov Cap-1 Maneuver	1425	-		-	-	693	891									
Mov Cap-2 Maneuver	-	-		-	-	717	-									
Stage 1	-	-		-	-	873	-									
Stage 2	-	-		-	-	883	-									
Approach	EB		WB		SB											
HCM Control Delay, s	0.2		0		9.9											
HCM LOS					A											
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBL	SBLn1										
Capacity (veh/h)	1425	-	-	-	738											
HCM Lane V/C Ratio	0.003	-	-	-	0.01											
HCM Control Delay (s)	7.5	0	-	-	9.9											
HCM Lane LOS	A	A	-	-	A											
HCM 95th %tile Q(veh)	0	-	-	-	0											

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HCM 2010 Signalized Intersection Summary
4: Scottsdale Rd & Indian Bend Rd.

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	76	17	541	117	142	15	1189	369	148	1487	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	28	83	18	588	127	154	16	1292	401	161	1616	23
Adj No. of Lanes	1	1	1	2	1	1	1	3	1	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	113	96	652	475	628	353	2076	946	402	2110	30
Arrive On Green	0.02	0.06	0.06	0.19	0.25	0.28	0.28	0.82	0.82	0.14	0.41	0.41
Sat Flow, veh/h	1774	1863	1583	3442	1863	1583	1774	5085	1583	1774	5166	74
Grp Volume(v), veh/h	28	83	18	588	127	154	16	1292	401	161	1060	579
Grp Sat Flow(s), veh/h/ln	1774	1863	1583	1721	1863	1583	1774	1695	1583	1774	1695	1850
O Serve(g_s), s	1.9	5.3	1.3	20.0	6.5	0.7	0.0	11.4	0.0	0.0	32.3	32.3
Cycle O Clear(g_c), s	1.9	5.3	1.3	20.0	6.5	0.7	0.0	11.4	0.0	0.0	32.3	32.3
Prop In Lane	1.00			1.00	1.00		1.00	1.00		1.00	1.00	0.04
Lane Grp Cap(c), veh/h	36	113	96	652	475	628	353	2076	946	402	1384	755
V/C Ratio(X)	0.78	0.73	0.19	0.90	0.27	0.25	0.05	0.62	0.42	0.40	0.77	0.77
Avail Cap(c_a), veh/h	177	155	132	803	475	628	353	2076	946	402	1384	755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.5	55.4	53.5	47.5	35.7	14.2	27.1	7.6	3.3	33.6	30.6	30.6
Incr Delay (d2), s/veh	12.6	6.0	0.3	10.4	0.1	0.1	0.0	1.4	1.4	0.2	4.1	7.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%), veh/ln	1.1	2.9	0.6	10.5	3.4	2.6	0.3	5.3	2.2	4.6	15.8	17.9
LnGrp Delay(d), s/veh	71.2	61.4	53.9	58.0	35.9	14.2	27.1	9.0	4.7	33.9	34.7	37.9
LnGrp LOS	E	E	D	E	D	B	C	A	A	C	C	D
Approach Vol, veh/h	129				869			1709			1800	
Approach Delay, s/veh	62.5				47.0			8.1			35.6	
Approach LOS	E				D			A			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	55.0	29.7	14.3	21.0	55.0	6.4	37.6				
Change Period (Y+Rc), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7				
Max Green Setting (Gmax), s	* 12	49.0	* 28	* 10	* 12	49.0	12.0	* 26				
Max O Clear Time (g_c+11), s	2.0	13.4	22.0	7.3	2.0	34.3	3.9	8.5				
Green Ext Time (p_c), s	0.1	2.1	0.7	0.0	0.1	2.3	0.0	1.4				
Intersection Summary												
HCM 2010 Ctrl Delay							28.2					
HCM 2010 LOS							C					
Notes	User approved pedestrian interval to be less than phase max green.											

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HCM 2010 TWSC

5: Scottsdale Rd & Joshua Tree Ln

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Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	3	5	1547	4	1	1934
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	5	1682	4	1	2102
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	2527	843	0	0	1686	0
Stage 1	1684	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	48	264	-	-	180	-
Stage 1	91	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	48	264	-	-	180	-
Mov Cap-2 Maneuver	86	-	-	-	-	-
Stage 1	91	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	30.7	-	0	-	0	-
HCM LOS	D	-	-	-	-	-
Minor Lane/Major Mvmt	NBT	NBR	WB	NB	SB	BT
Capacity (veh/h)	-	-	149	180	-	-
HCM Lane V/C Ratio	-	-	0.058	0.006	-	-
HCM Control Delay (s)	-	-	30.7	25.1	-	-
HCM Lane LOS	-	-	D	D	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

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HCM 2010 Signalized Intersection Summary

6: Scottsdale Rd & 6750 North

7/22/2016

Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑		
Volume (veh/h)	18	0	44	1497	1996	89		
Number	7	14	5	2	6	16		
Initial Q (Q _b), veh	0	0	0	0	0	0		
Ped-Bike Adj(A _{pbT})	1.00	1.00	1.00	1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	20	0	48	1627	2170	97		
Adj No. of Lanes	1	1	1	3	3	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	36	32	205	4474	4474	1393		
Arrive On Green	0.02	0.00	0.29	1.00	1.00	1.00		
Sat Flow, veh/h	1774	1583	165	5253	5253	1583		
Grp Volume(v), veh/h	20	0	48	1627	2170	97		
Grp Sat Flow(s), veh/h/ln	1774	1583	165	1695	1695	1583		
O Serve(g _s), s	1.3	0.0	27.4	30.5	0.0	0.0		
Cycle O Clear(g _c), s	1.3	0.0	27.4	30.5	0.0	0.0		
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	36	32	205	4474	4474	1393		
V/C Ratio(X)	0.56	0.00	0.23	0.36	0.49	0.07		
Avail Cap(c _a), veh/h	281	251	205	4474	4474	1393		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	2.00	2.00		
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	58.2	0.0	14.9	15.9	0.0	0.0		
Incr Delay (d2), s/veh	4.9	0.0	2.7	0.2	0.4	0.1		
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(-26165%), veh/ln	0.7	0.0	1.4	14.5	0.2	0.0		
LnGrp Delay(d), s/veh	63.2	0.0	17.5	16.2	0.4	0.1		
LnGrp LOS	E	-	B	B	A	A		
Approach Vol, veh/h	20	-	1675	2267	-	-		
Approach Delay, s/veh	63.2	-	16.2	0.4	-	-		
Approach LOS	E	-	B	A	-	-		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	-	-	-	4	-	6	-	-
Phs Duration (G+Y+R _c), s	-	-	111.6	8.4	-	111.6	-	-
Change Period (Y+R _c), s	-	* 6	-	6.0	-	* 6	-	-
Max Green Setting (Gmax), s	-	* 89	-	19.0	-	* 89	-	-
Max O Clear Time (g _c +h1), s	-	32.5	-	3.3	-	2.0	-	-
Green Ext Time (p _c), s	-	15.3	-	0.0	-	15.8	-	-
Intersection Summary							7.4	
HCM 2010 Ctrl Delay							A	
Notes								
User approved pedestrian interval to be less than phase max green.								

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HCM 2010 TWSC
10: Quail Run Road & Lincoln Dr

7/22/2016

Intersection	
Int Delay, s/veh	0.2
Movement	
EBT	EBR
Vol, veh/h	1024
Conflicting Peds, #/hr	0
Sign Control	Free Free
RT Channelized	- None
Storage Length	- -
Veh in Median Storage, #	0 -
Grade, %	0 -
Peak Hour Factor	92 92
Heavy Vehicles, %	2 2
Mvmt Flow	1113 5
Major/Minor	
Major1	Major2
Conflicting Flow All	0 0
Stage 1	- -
Stage 2	- -
Critical Hdwy	- -
Critical Hdwy Stg 1	4.14
Critical Hdwy Stg 2	- -
Follow-up Hdwy	- -
Pot Cap-1 Maneuver	- -
Stage 1	- -
Stage 2	- -
Platoon blocked, %	- -
Mov Cap-1 Maneuver	- -
Mov Cap-2 Maneuver	- -
Stage 1	- -
Stage 2	- -
Approach	
EB	WB
HCM Control Delay, s	0 0
HCM LOS	34.2 D
Minor Lane/Major Mvmt	
NBLn1	EBT EBR WBL WBT
Capacity (veh/h)	134 - - 620 -
HCM Lane V/C Ratio	0.081 - - 0.009 -
HCM Control Delay (s)	34.2 - - 10.9 -
HCM Lane LOS	D - - B -
HCM 95th %tile Q(veh)	0.3 - - 0 -

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HCM 2010 Signalized Intersection Summary
11: Scottsdale Rd & Lincoln Dr

7/22/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑↑	↑↑	↑↑	↑↑↑	↑↑	↑↑	↑↑↑↑	↑↑↑↑
Volume (veh/h)	551	44	368	24	32	39	266	1082	28	27	1584	570
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	633	0	400	26	35	42	289	1176	30	29	1722	620
Adj No. of Lanes	2	0	1	1	2	0	2	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	562	0	474	75	75	67	628	2337	60	250	2119	727
Arrive On Green	0.16	0.00	0.16	0.04	0.04	0.04	0.18	0.46	0.46	0.05	0.14	0.14
Sat Flow, veh/h	3548	0	1583	1774	1770	1583	3442	5100	130	1774	5085	1583
Grp Volume(v), veh/h	633	0	400	26	35	42	289	782	424	29	1722	620
Grp Sat Flow(s), veh/h/ln	1774	0	1583	1774	1770	1583	1721	1695	1840	1774	1695	1583
O Serve(g_s), s	19.0	0.0	11.5	1.7	2.3	3.1	9.0	19.5	19.5	1.9	39.5	43.2
Cycle O Clear(g_c), s	19.0	0.0	11.5	1.7	2.3	3.1	9.0	19.5	19.5	1.9	39.5	43.2
Prop In Lane	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.07	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	562	0	474	75	75	67	628	1554	843	250	2119	727
V/C Ratio(X)	1.13	0.00	0.84	0.35	0.47	0.63	0.46	0.50	0.50	0.12	0.81	0.85
Avail Cap(c_a), veh/h	562	0	474	177	177	158	628	1554	843	250	2119	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.5	0.0	39.4	55.8	56.1	56.5	43.8	22.9	22.9	50.0	47.2	43.2
Incr Delay (d2), s/veh	77.9	0.0	12.5	1.0	1.7	3.5	0.2	1.2	2.1	0.1	3.5	12.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%), veh/ln	15.4	0.0	6.6	0.9	1.2	1.4	4.3	9.4	10.4	0.9	19.2	22.9
LnGrp Delay(d), s/veh	128.4	0.0	51.9	56.9	57.8	60.0	44.0	24.0	25.0	50.1	50.7	55.4
LnGrp LOS	F	D	E	E	D	C	C	D	D	E		
Approach Vol, veh/h	1033				103			1495			2371	
Approach Delay, s/veh	98.8				58.5			28.2			51.9	
Approach LOS	F				E			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.9	61.0		12.1	25.9	56.0		26.0				
Change Period (Y+Rc), s	4.0	6.0		7.0	4.0	6.0		7.0				
Max Green Setting (Gmax), s	10.0	55.0		12.0	15.0	50.0		19.0				
Max O Clear Time (g_c+1), s	3.9	21.5		5.1	11.0	45.2		21.0				
Green Ext Time (p_c), s	0.1	1.7		0.1	0.1	1.9		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay					54.6							
HCM 2010 LOS					D							
Notes												
User approved pedestrian interval to be less than phase max green.												

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HCM 2010 TWSC
16: Scottsdale Rd & Tuckey Ln

7/22/2016

Intersection						
	Int Delay, s/veh					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	3	10	1505	2	8	1850
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	11	1636	2	9	2011
Major/Minor						
Conflicting Flow All	Minor1	Major1	Major2		Major3	
Conflicting Flow All	2459	819	0	0	1638	0
Stage 1	1637	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	53	273	-	-	190	-
Stage 1	97	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	50	273	-	-	190	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	97	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Approach						
	WB	NB	SB		EB	
HCM Control Delay, s	25.8	-	0	0.1	-	0.2
HCM LOS	D	-	-	-	-	A
Minor Lane/Major Mvmt						
	NBT	NBR	WBLn1	SBL	SBT	EBLn1
Capacity (veh/h)	-	-	187	190	-	-
HCM Lane V/C Ratio	-	-	0.076	0.046	-	-
HCM Control Delay (s)	-	-	25.8	24.9	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-	-

Palmerae - Existing AM 7/3/2015 Existing AM
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HCM 2010 TWSC
3: Indian Bend Rd. & Scottsdale Plaza Resort

7/22/2016

Intersection						
	Int Delay, s/veh					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	118	-	-	152	14
Conflicting Peds, #/hr	0	0	-	-	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	-	0	0	-
Grade, %	-	0	-	0	0	-
Peak Hour Factor	92	92	-	-	92	92
Heavy Vehicles, %	2	2	-	-	2	2
Mvmt Flow	4	128	-	-	165	15
Major/Minor						
Conflicting Flow All	Major1	Major2		Major3		Minor2
Conflicting Flow All	180	0	-	0	310	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	137	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2,218	-	-	-	3,518	3,318
Pot Cap-1 Maneuver	1396	-	-	-	682	871
Stage 1	-	-	-	-	857	-
Stage 2	-	-	-	-	890	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1396	-	-	-	680	871
Mov Cap-2 Maneuver	-	-	-	-	680	-
Stage 1	-	-	-	-	857	-
Stage 2	-	-	-	-	887	-
Approach						
	EB	WB		SB		EBLn1
HCM Control Delay, s	0.2	-	0	-	9.8	-
HCM LOS	D	-	-	-	A	-
Minor Lane/Major Mvmt						
	EBL	EBT	WBT	WBR	SBLn1	EBLn1
Capacity (veh/h)	1396	-	-	-	764	-
HCM Lane V/C Ratio	0.003	-	-	-	0.011	-
HCM Control Delay (s)	7.6	0	-	-	9.8	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	-

Palmerae - Existing PM 7/3/2015 Existing PM
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HCM 2010 Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

7/22/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	92	11	411	130	127	40	1714	465	175	1418	37
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj(A _{pbt})	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	50	100	12	447	141	138	43	1863	505	190	1541	40
Adj No. of Lanes	1	1	1	2	1	1	1	3	1	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	64	130	110	510	385	576	395	2161	908	371	2166	56
Arrive On Green	0.04	0.07	0.07	0.15	0.21	0.21	0.31	0.85	0.85	0.16	0.43	0.43
Sat Flow, veh/h	1774	1863	1583	3442	1863	1583	1774	5085	1583	1774	5097	132
Grp Volume(v), veh/h	50	100	12	447	141	138	43	1863	505	190	1025	556
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1774	1695	1583	1774	1695	1839
Q Serve(q _s), s	3.4	6.3	0.9	15.3	7.8	0.8	0.0	24.7	0.0	5.1	29.9	29.9
Cycle Q Clear(g _c), s	3.4	6.3	0.9	15.3	7.8	0.8	0.0	24.7	0.0	5.1	29.9	29.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	64	130	110	510	385	576	395	2161	908	371	1441	782
V/C Ratio(X)	0.78	0.77	0.11	0.88	0.37	0.24	0.11	0.86	0.56	0.51	0.71	0.71
Avail Cap(c _a), veh/h	207	171	145	660	385	576	395	2161	908	371	1441	782
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.3	54.9	52.3	50.0	40.9	15.1	24.4	7.0	3.1	41.3	28.4	28.4
Incr Delay (d2), s/veh	7.3	10.0	0.2	8.8	0.2	0.1	0.0	4.8	2.5	0.5	3.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(26165%),veh/ln	1.8	3.6	0.4	7.9	4.0	2.4	0.9	11.3	2.6	5.6	14.6	16.3
LnGrp Delay(d),s/veh	64.6	64.9	52.5	58.8	41.1	15.2	24.4	11.9	5.6	41.8	31.4	33.9
LnGrp LOS	E	E	D	E	D	B	C	B	A	D	C	C
Approach Vol, veh/h	162			726			2411			1771		
Approach Delay, s/veh	63.9			47.1			10.8			33.3		
Approach LOS	E			D			B			C		

Intersection Summary

HCM 2010 Ctrl Delay 25.5

HCM 2010 LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Palmerae - Existing PM 7/3/2015 Existing PM
CivTech - DO

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HCM 2010 TWSC

5: Scottsdale Rd & Joshua Tree Ln

7/22/2016

Intersection	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	2190	6	9	1922
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	2380	7	10	2089
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3239	1193	0	0	2387	0
Stage 1	2384	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	-	5.34
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	19	154	-	-	79	-
Stage 1	32	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	17	154	-	-	79	-
Mov Cap-2 Maneuver	30	-	-	-	-	-
Stage 1	32	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	96		0		0.3	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	50	79	-	
HCM Lane V/C Ratio	-	-	0.217	0.124	-	
HCM Control Delay (s)	-	-	96	56.9	-	
HCM Lane LOS	-	-	F	F	-	
HCM 95th %tile Q(veh)	-	-	0.7	0.4	-	

Palmerae - Existing PM 7/3/2015 Existing PM

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HCM 2010 Signalized Intersection Summary

6: Scottsdale Rd & 6750 North

7/22/2016

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Volume (veh/h)	61	36	3	2131	1979	11
Number	7	14	5	2	6	16
Initial Q (Q _b), veh	0	0	0	0	0	0
Ped/Bike Adj(A _{pbt})	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/in	1863	1863	1863	1863	1863	
Adj Flow Rate, veh/h	66	39	3	2316	2151	12
Adj No. of Lanes	1	1	1	3	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	93	83	215	4310	4310	1342
Arrive On Green	0.05	0.05	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1774	1583	183	5253	5253	1583
Grp Volume(v), veh/h	66	39	3	2316	2151	12
Grp Sat Flow(s), veh/h/in	1774	1583	183	1695	1695	1583
Q Serve(g _s), s	4.4	2.9	0.0	0.0	0.0	0.0
Cycle Q Clear(g _c), s	4.4	2.9	0.0	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	93	83	215	4310	4310	1342
V/C Ratio(X)	0.71	0.47	0.01	0.54	0.50	0.01
Avail Cap(c _a), veh/h	266	237	215	4310	4310	1342
HCM Platoon Ratio	1.00	1.00	1.33	1.33	2.00	2.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	56.0	55.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.7	1.5	0.1	0.5	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(26165%), veh/in	2.3	1.3	0.0	0.2	0.2	0.0
LnGrp Delay(d), s/veh	59.6	56.8	0.1	0.5	0.4	0.0
LnGrp LOS	E	E	A	A	A	A
Approach Vol, veh/h	105			2319	2163	
Approach Delay, s/veh	58.6			0.5	0.4	
Approach LOS	E			A	A	
Timer	1	2	3	4	5	6
Assigned Phs				4		6
Phs Duration (G+Y+R _c), s	107.7			12.3		107.7
Change Period (Y+R _c), s	* 6			6.0		* 6
Max Green Setting (Gmax), s	* 90			18.0		* 90
Max Q Clear Time (g _{c+l}), s	2.0			6.4		2.0
Green Ext Time (p _c), s	18.6			0.1		18.6

Intersection Summary

HCM 2010 Ctrl Delay 1.8
HCM 2010 LOS A

Notes

User approved pedestrian interval to be less than phase max green.

Palmerae - Existing PM 7/3/2015 Existing PM
CivTech - DO

Synchro 8 Report
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HCM 2010 TWSC

10: Quail Run Road & Lincoln Dr

Intersection	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	498	5	5	870	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	541	5	5	946	5	5
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	547	0	1028	273
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1018	-	230	725
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1018	-	229	725
Mov Cap-2 Maneuver	-	-	-	-	229	-
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	582	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		15.7	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	348	-	-	1018	-	
HCM Lane V/C Ratio	0.031	-	-	0.005	-	
HCM Control Delay (s)	15.7	-	-	8.6	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

Palmerae - Existing PM 7/3/2015 Existing PM
CivTech - DO

Synchro 8 Report
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HCM 2010 Signalized Intersection Summary
11: Scottsdale Rd & Lincoln Dr

7/22/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	539	45	358	41	54	52	328	1523	36	54	1439	398
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj(A _{pbt})	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863
Adj Flow Rate, veh/h	621	0	389	45	59	57	357	1655	39	59	1564	433
Adj No. of Lanes	2	0	1	1	2	0	2	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	591	0	507	97	99	85	816	2172	51	273	1737	627
Arrive On Green	0.17	0.00	0.17	0.05	0.05	0.05	0.24	0.43	0.43	0.05	0.11	0.11
Sat Flow, veh/h	3548	0	1583	1774	1807	1551	3442	5111	120	1774	5085	1583
Grp Volume(v), veh/h	621	0	389	45	58	58	357	1098	596	59	1564	433
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	1770	1589	1721	1695	1841	1774	1695	1583
Q Serve(g_s), s	20.0	0.0	8.1	3.0	3.8	4.3	10.6	33.0	33.0	3.8	36.4	29.4
Cycle Q Clear(g_c), s	20.0	0.0	8.1	3.0	3.8	4.3	10.6	33.0	33.0	3.8	36.4	29.4
Prop In Lane	1.00		1.00	1.00		0.98	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	591	0	507	97	97	87	816	1441	783	273	1737	627
V/C Ratio(X)	1.05	0.00	0.77	0.46	0.60	0.67	0.44	0.76	0.76	0.22	0.90	0.69
Avail Cap(c_a), veh/h	591	0	507	207	206	185	816	1441	783	273	1737	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	36.7	55.0	55.4	55.7	39.0	29.3	29.3	50.0	51.2	41.4
Incr Delay (d2), s/veh	50.9	0.0	6.3	1.3	2.2	3.4	0.1	3.9	6.9	0.1	7.9	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(26165%),veh/ln	14.0	0.0	4.3	1.5	1.9	2.0	5.1	16.2	18.2	1.9	18.4	15.1
LnGrp Delay(d),s/veh	100.9	0.0	43.0	56.3	57.6	59.0	39.1	33.2	36.3	50.2	59.2	47.5
LnGrp LOS	F	D	E	E	E	D	C	D	D	E	D	
Approach Vol, veh/h	1010			161			2051			2056		
Approach Delay, s/veh	78.6			57.8			35.1			56.4		
Approach LOS	E			E			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+R _c), s	22.5	57.0		13.5	32.5	47.0		27.0				
Change Period (Y+R _c), s	4.0	6.0		7.0	4.0	6.0		7.0				
Max Green Setting (Gmax), s	11.0	51.0		14.0	21.0	41.0		20.0				
Max Q Clear Time (g_c+l1), s	5.8	35.0		6.3	12.6	38.4		22.0				
Green Ext Time (p_c), s	0.2	2.5		0.3	0.2	1.1		0.0				

Intersection Summary

HCM 2010 Ctrl Delay 52.4
HCM 2010 LOS D

Notes

User approved pedestrian interval to be less than phase max green.

Palmerae - Existing PM 7/3/2015 Existing PM
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HCM 2010 TWSC
16: Scottsdale Rd & Tuckey Ln

7/22/2016

Intersection												
Int Delay, s/veh	0.4											
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Vol, veh/h	4	4	2112	5	8	1976						
Conflicting Peds, #/hr	0	0	0	0	0	0						
Sign Control	Stop	Stop	Free	Free	Free	Free						
RT Channelized	-	None	-	None	-	None						
Storage Length	0	-	-	-	125	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	92	92	92	92	92	92						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	4	4	2296	5	9	2148						
Major/Minor												
Conflicting Flow All	3175	1151	0	0	2301	0						
Stage 1	2298	-	-	-	-	-						
Stage 2	877	-	-	-	-	-						
Critical Hdwy	5.74	7.14	-	-	-	-	5.34	-	-	-	-	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	-	-	3.12	-	-	-	-	-
Pot Cap-1 Maneuver	21	164	-	-	-	-	88	-	-	-	-	-
Stage 1	36	-	-	-	-	-	-	-	-	-	-	-
Stage 2	332	-	-	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	19	164	-	-	-	-	88	-	-	-	-	-
Mov Cap-2 Maneuver	19	-	-	-	-	-	-	-	-	-	-	-
Stage 1	36	-	-	-	-	-	-	-	-	-	-	-
Stage 2	298	-	-	-	-	-	-	-	-	-	-	-
Approach												
	WB		NB		SB							
HCM Control Delay, s	144		0		0.2							
HCM LOS	F											
Minor Lane/Major Mvmt												
Capacity (veh/h)	-	-	34	88	-	-						
HCM Lane V/C Ratio	-	-	0.256	0.099	-	-						
HCM Control Delay (s)	-	-	144	50.3	-	-						
HCM Lane LOS	-	-	F	F	-	-						
HCM 95th %tile Q(veh)	-	-	0.8	0.3	-	-						

Palmerae - Existing PM 7/3/2015 Existing PM
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APPENDIX D

CRASH ANALYSIS WORKSHEETS

REPORT #	YYMMDD	HHMM	TOTAL UNI	TOTAL INJ	TOTAL FAT	INCIDENT	HIT AND R	RNS	ST	NS	SF	EW ST	EW SF
19-06019	190318	1745	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-07582	190408	0751	5	1	0	2				SCOTTS	DAIR	LINCOLN	DR
19-08148	190415	1430	2	3	0	3				SCOTTS	DAIR	INDIAN BE	RD
19-08306	190417	1417	2	1	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-09046	190426	1619	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-09237	190429	1115	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-09911	190508	1016	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-12180	190607	0913	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-15841	190728	1544	3	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-18625	190904	1430	2	1	0	3				SCOTTS	DAIR	INDIAN BE	RD
19-19601	190918	0859	3	2	0	2				SCOTTS	DAIR	LINCOLN	DR
19-21017	191008	0534	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-27760	191031	1619	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-24153	191119	0906	2	3	0	3				SCOTTS	DAIR	LINCOLN	DR
19-25436	191207	2017	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-25698	191211	1540	2	1	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-26272	191219	0540	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-21360	191012	1823	2	0	0	1 Y				SCOTTS	DAIR	INDIAN BE	RD
19-03823	190218	0931	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-09676	190504	2001	2	0	0	1 Y				SCOTTS	DAIR	LINCOLN	DR
19-10593	190517	0836	2	1	0	3				SCOTTS	DAIR	INDIAN BE	RD
19-11290	190526	1801	1	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-11607	190530	1500	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-12596	190613	1140	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-18615	190904	1250	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-22802	191101	0214	1	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-23237	191106	1754	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-24448	191123	1631	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-25586	191209	1747	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-04820	190303	0101	1	1	0	2				SCOTTS	DAIR	INDIAN BE	RD
19-10010	190509	1420	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-10554	190516	1855	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-22167	191023	1815	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR
19-25014	191202	1031	2	0	0	1				SCOTTS	DAIR	INDIAN BE	RD
19-26565	191223	1119	2	2	0	2				SCOTTS	DAIR	LINCOLN	DR
19-26793	191227	1752	2	1	0	2				SCOTTS	DAIR	LINCOLN	DR
19-01863	190125	1731	2	0	0	1				SCOTTS	DAIR	LINCOLN	DR

UNIT 1 DO	UNIT 2 TYP	UNIT 2 DO	LIGHT CON	WEATHER	ROAD SUR	ROAD GRA	RELATION	MANNER	TRAVEL DI	TRAVEL DI	CONTRIB C
7/23/1986 1		7/27/1991	1	1	1	1	0	4 WB	WB		0
3/9/1993 1		8/11/1973	1	1	1	1	0	3 NB	SB		0
8/27/1964 1		9/25/1983	1	1	1	1	1	3 NB	SB		0
8/31/1986 1		12/23/1981	1	1	1	1	11	2 SB	NB		0
6/29/1995 1		8/5/1984	1	1	1	1	2	6 WB	WB		0
9/10/1969 1		9/28/1927	1	2	1	1	11	6 NB	NB		0
1/13/1992 1		4/27/1945	1	1	1	1	2	4 NB	NB		0
4/22/1987 1		11/24/1934	1	1	1	1	2	4 EB	EB		0
3/22/1987 1		7/6/1983	1	1	1	1	1	2 SB	EB		0
7/17/1956 1		10/27/1970	1	1	1	1	1	3 SB	EB		99
12/31/1971 1		12/21/1980	1	1	1	1	0	4 SB	SB		0
11/11/1961 1		8/14/1973	4	1	1	1	1	2 SB	WB		99
5/14/1948 1		7/14/1933	1	1	1	1	1	3 NB	SB		0
11/30/1961 1		10/29/1991	1	2	1	1	0	3 SB	EB		0
1/22/1969 1		1/29/1982	4	4	2	1	1	6 WB	WB		0
2/8/1987 1		7/23/1954	1	1	1	1	2	4 SB	SB		0
4/29/1986 1		8/13/1954	4	1	1	1	11	2 SB	EB		97
1		1/15/2003	4	1	1	1	0	6 EB	EB		99
4/9/1961 1		3/20/1957	1	4	2	1	12	4 SB	SB		3
1		2/17/1994	4	1	1	1	0	6 SB	SB		0
2/27/1987 1		5/28/1997	1	1	1	1	1	4 SB	SB		0
12/18/1951			1	1	1	1	0	1 SB			0
2/4/1954 1		1/18/1975	1	1	1	1	2	6 NB	NB		0
4/24/1990 1		4/15/1945	1	1	1	1	0	6 SB	SB		0
3/13/1998 1		6/18/1997	1	1	1	1	2	2 WB	SB		
5/28/1992			4	1	1	1	0	1 NB			0
11/15/1961 1		5/3/1990	3	1	1	1	2	4 NB	NB		0
10/15/1991 1		10/18/1991	1	1	1	1	0	4 NB	NB		0
11/12/1921 1		5/7/1996	4	1	1	1	12	4 SB	SB		0
1/7/2002			4	1	1	1	0	1 SB			0
7/8/1940 1		4/6/1960	1	2	1	1	0	3 SB	SB		0
10/17/1991 1		3/11/1992	3	1	1	1	2	4 NB	NB		0
1/22/1951 1		3/22/1977	4	1	1	1	0	2 WB	NB		0
1/14/1950 1		6/22/1969	1	2	1	1	12	4 NB	NB		0
1/11/1997 1		8/19/1978	1	2	1	1	0	4 NB	NB		0
12/13/1971 1		7/22/2001	4	4	2	1	7	4 SB	SB		0
3/10/1942 1		10/1/1941	1	1	1	1	0	2 SB	EB		99

CONTRIB C DISTRACTE	DISTRACTE	PHYS INFLI	PHYS INFLI	VIOLATION	VIOLATION	VIOLATION	VIOLATION	UNIT 2
0	8	0	0	0	4	1		
0			0	0	7	1		
0	4	0	0	0	6	1		
0			0	0	20	1		
0	0	0	0	0	12	1		
0	0	0	0	0	99	99		
0	0	0	0	0	2	1		
0	0	0	0	0	2	1		
0	8	8	0	0	6	1		
0	8	8	0	0	99	99		
0	0	0	0	0	2	1		
0	8	0	0	0	2	1		
0	8	0	0	0	6	1		
0	0	0	0	0	20	1		
0	8	0	0	0	7	1		
0	8	0	0	0	0	1		
0	6	0	3	0	6	1		
0	8	0	99	0	13	1		
3	0	0	0	0	2	1		
0	8	0	99	0	99	1		
0	0	0	0	0	2	1		
	8		0		2	0		
0	8	8	0	0	99	99		
0	0	0	0	0	2	1		
	8	8	0	0	20	1		
	2		4		8	0		
0	0	0	0	0	2	1		
0	0	0	0	0	2	1		
	7		0		3	0		
0	0	8	0	0	20	1		
0	8	8	4	0	4	1		
0	0	0	0	0	20	1		
0	8	0	0	0	2	1		
0	8	0	0	0	2	1		
0	0	0	0	0	4	1		
99	8	8	0	0	97	1		

REPORT #	YYMMDD	HHMM	NS ST	NS SF	EW ST	EW SF	DIR FROM	DIST FROM	AUX REF S	DIR FROM	DOB 1	VIOL 1	VIOL 2	ACTION 1
17-01501	170120	1200	SCOTTSDAI RD		INDIAN BEI RD		AT				11/5/1992	2	1	2
17-03857	170216	0843	SCOTTSDAI RD		LINCOLN DR		AT				7/29/1961	1	1	5
17-05577	170309	1505	SCOTTSDAI RD		INDIAN BEI RD		AT					2	1	1
17-05989	170314	1211	SCOTTSDAI RD		LINCOLN DR		AT				11/23/1991	6	1	1
17-07197	170328	0834	SCOTTSDAI RD		INDIAN BEI RD		AT				6/5/1920	20	1	4
17-08752	170417	0746	SCOTTSDAI RD		INDIAN BEI RD		AT				10/16/1951	2	1	1
17-13810	170621	1220	SCOTTSDAI RD		LINCOLN DR		AT				7/14/1999	2	1	1
17-15842	170716	2152	SCOTTSDAI RD		LINCOLN DR		AT				5/1/1998	2	1	2
17-18713	170824	1049	SCOTTSDAI RD		INDIAN BEI RD		AT				3/10/1968	7	1	4
17-19317	170901	0844	SCOTTSDAI RD		LINCOLN DR		AT				2/6/1992	2	1	1
17-20852	170920	1908	SCOTTSDAI RD		LINCOLN DR		AT				12/4/1987	99	99	5
17-22986	171017	1411	SCOTTSDAI RD		INDIAN BEI RD		AT				2/28/1968	6	1	1
17-23160	171019	2001	SCOTTSDAI RD		LINCOLN DR		AT				9/3/1997	4	1	1
17-23745	171026	1724	SCOTTSDAI RD		LINCOLN DR		AT				3/3/1971	2	1	1
17-24442	171103	1520	SCOTTSDAI RD		INDIAN BEI RD		AT				9/20/1965	6	1	1
17-27937	171217	2136	SCOTTSDAI RD		LINCOLN DR		AT				10/31/1991	12	1	8
18-00244	180104	1345	SCOTTSDAI RD		INDIAN BEI RD		AT				2/16/1994		1	1
18-01171	180116	0856	SCOTTSDAI RD		LINCOLN DR		AT				6/6/1971	2	1	1
18-02398	180201	0930	SCOTTSDAI RD		INDIAN BEI RD		AT				9/16/1997	6	1	1
18-02864	180205	1608	SCOTTSDAI RD		LINCOLN DR		AT				5/17/1959	7	1	5
18-03143	180208	1832	SCOTTSDAI RD		INDIAN BEI RD		AT				10/2/1953	12	1	5
18-03226	180209	1729	SCOTTSDAI RD		LINCOLN DR		AT				6/29/1951	20	1	5
18-03827	180217	1344	SCOTTSDAI RD		LINCOLN DR		AT				1/8/1994	6	1	1
18-07152	180330	1708	SCOTTSDAI RD		INDIAN BEI RD		AT				12/30/1961	6	1	1
18-09106	180423	1752	SCOTTSDAI RD		INDIAN BEI RD		AT				12/28/1991	6	1	1
18-11197	180520	0715	SCOTTSDAI RD		LINCOLN DR		AT				4/4/1977	6	1	1
18-11225	180520	1553	SCOTTSDAI RD		INDIAN BEI RD		AT				10/19/1991	6	1	1
18-11706	180526	1247	SCOTTSDAI RD		INDIAN BEI RD		AT				12/28/1941	6	1	1
18-11813	180527	1520	SCOTTSDAI RD		INDIAN BEI RD		AT				10/10/1951	12	1	8
18-12010	180530	0749	SCOTTSDAI RD		LINCOLN DR		AT				8/24/1973	2	1	1
18-12738	180608	1811	SCOTTSDAI RD		LINCOLN DR		AT				12/18/1958		1	4
18-12946	180611	0955	SCOTTSDAI RD		LINCOLN DR		AT				5/5/1950	20	1	4
18-14042	180625	1354	SCOTTSDAI RD		LINCOLN DR		AT				5/20/1980	7	1	4
18-15115	180709	0737	SCOTTSDAI RD		LINCOLN DR		AT				8/4/1987	2	1	1
18-19158	180830	1515	SCOTTSDAI RD		LINCOLN DR		AT					99	1	1
18-21519	181001	1837	SCOTTSDAI RD		LINCOLN DR		AT				10/16/1963		1	10
18-22506	181015	1428	SCOTTSDAI RD		LINCOLN DR		AT				9/16/1982	2		1
18-22724	181018	0732	SCOTTSDAI RD		LINCOLN DR		AT				12/30/1941	20	1	4
18-24856	181116	1814	SCOTTSDAI RD		TUCKEY LN		AT		LINCOLN N		7/11/1938	12	1	8
18-25180	181121	0917	SCOTTSDAI RD		INDIAN BEI RD		AT				1/29/1996	2	1	1
17-01077	170114	1658	SCOTTSDAI RD		INDIAN BEI RD	N		101			4/17/1994	1	1	5
17-02990	170205	2045	SCOTTSDAI RD		INDIAN BEI RD	N		101				99		99
17-03675	170214	1350	SCOTTSDAI RD		LINCOLN DR	N		845				99	1	7
17-17748	170811	1203	SCOTTSDAI RD		INDIAN BEI RD	N		101			4/5/1977	12	1	8
18-01177	180116	1123	SCOTTSDAI RD		INDIAN BEI RD	N		300			3/23/1998		1	1
18-03025	180207	1334	SCOTTSDAI RD		INDIAN BEI RD	N		45			4/20/1995	12	1	8
18-03079	180208	0749	SCOTTSDAI RD		LINCOLN DR	N		50			3/15/1940	2	1	1
18-13885	180623	1053	SCOTTSDAI RD		INDIAN BEI RD	N		300			3/29/1958	2	1	1
18-22809	181019	1121	SCOTTSDAI RD		INDIAN BEI RD	N		175			2/4/1970		1	1
18-25779	181129	1637	SCOTTSDAI RD		INDIAN BEI RD	N		135			1/21/1963	99	99	8
17-03910	170216	1717	SCOTTSDAI RD		LINCOLN DR	S		500			7/7/1994	12	1	8
17-05843	170312	1645	SCOTTSDAI RD		LINCOLN DR	S		370			7/11/1989	4	1	5
17-06561	170320	1258	SCOTTSDAI RD		INDIAN BEI RD	S		65			1/17/1992		1	1
17-08284	170411	0957	SCOTTSDAI RD		INDIAN BEI RD	S		59			4/30/1948	2	1	1
17-09102	170421	1812	SCOTTSDAI RD		LINCOLN DR	S		170			8/7/1927	2	1	1
17-12176	170530	0840	SCOTTSDAI RD		INDIAN BEI RD	S		60			7/7/1986		1	1
17-15761	170716	0058	SCOTTSDAI RD		LINCOLN DR	S		24				99	1	1
17-16120	170720	1504	SCOTTSDAI RD		LINCOLN DR	S		593			12/20/1991	99	99	8
17-22605	171012	1600	SCOTTSDAI RD		LINCOLN DR	S		610			6/10/1959	7	1	4
17-27079	171207	1235	SCOTTSDAI RD		LINCOLN DR	S		635				97	1	1
18-00773	180111	1405	SCOTTSDAI RD		INDIAN BEI RD	S		553			6/25/1961	2	1	1
18-03360	180211	1236	SCOTTSDAI RD		LINCOLN DR	S		250			6/16/1932	13	1	12
18-03611	180214	1825	SCOTTSDAI RD		LINCOLN DR	S		605			8/9/1977	1	1	2
18-03680	180215	1601	SCOTTSDAI RD		LINCOLN DR	S		100			5/31/1963	97	1	10
18-05468	180310	1341	SCOTTSDAI RD		INDIAN BEI RD	S		100			5/21/1998		1	1
18-05706	180313	1606	SCOTTSDAI RD		INDIAN BEI RD	S		136			9/18/2001	2	1</td	

ACTION 2 TRAVEL DII TRAVEL DII MANNER COMMENT DATE ENTERED

3 NB	NB	4	2/6/2017
97 NB	NB	6	3/2/2017
2 NB	NB	4 HIT AND RI	3/21/2017
4 NB	NB	3	3/22/2017
1 WB	SB	5 MULTI VEH	4/17/2017
3 WB	WB	4	6/12/2017
3 EB	EB	4	7/6/2017
3 SB	SB	4	8/1/2017
4 SB	SB	6	9/19/2017
3 EB	EB	4	9/28/2017
5 EB	EB	2	10/4/2017
1 SB	WB	2	10/27/2017
3 SB	SB	4	11/1/2017
3 EB	EB	4	11/10/2017
1 SB	EB	2	11/16/2017
1 SB	SB	2	1/29/2018
2 NB	NB	4	2/13/2018
3 EB	EB	6	3/1/2018
1 SB	EB	2	3/12/2018
3 WB	EB	7	3/15/2018
1 WB	WB	6	3/15/2018
3 SB	SB	4	3/15/2018
4 SB	NB	3 MULTI VEH	3/20/2018
4 NB	SB	3	4/17/2018
4 NB	EB	3	5/16/2018
1 EB	SB	2	6/14/2018
1 NB	EB	2	6/14/2018
1 SB	WB	2	6/18/2018
2 WB	WB	2	6/18/2018
3 EB	EB	4 MULTI VEH	6/14/2018
1 EB	SB	2	6/27/2018
1 NB	EB	3	6/29/2018
1 SB	EB	3	7/17/2018
3 EB	EB	4	7/25/2018
3 EB	EB	4 HIT AND RI	9/17/2018
14 SB	NB	4	10/17/2018
EB		1	10/25/2018
1 WB	EB	5	11/20/2018
1 SB	SB	2	12/20/2018
3 WB	WB	4	12/24/2018
1 EB	SB	2	1/20/2017
SB		1 HIT AND RI	2/15/2017
3 SB	SB	6 HIT AND RI	3/1/2017
1 SB	SB	6	8/29/2017
2 NB	NB	4 MULTI VEH	2/21/2018
1 SB	SB	6	3/15/2018
3 SB	SB	4	3/16/2018
3 SB	SB	4	7/13/2018
3 NB	NB	4	11/1/2018
99 NB	NB	6	12/28/2018
1 NB	NB	2	3/2/2017
12 WB	WB	4	3/28/2017
3 NB	NB	4 MULTI VEH	3/27/2017
3 NB	NB	4	4/18/2017
3 NB	NB	4 MULTI VEH	5/3/2017
1 NB	NB	4	6/22/6201
1 NB	NB	4 HIT AND RI	7/25/2017
1 SB	SB	6	8/15/2017
1 EB	NB	2	10/24/2017
3 EB	WB	5 HIT AND RI	1/16/2018
3 NB	NB	4 MULTI VEH	2/21/2018
14 99	99	3 HIT AND RI	3/20/2018
5 SB	SB	4	3/20/2018
1 EB	SB	8 HIT AND RI	3/20/2018
2 SB	SB	4 MULTI VEH	4/6/2018
3 SB	SB	4	4/10/2018
3 NB	NB	4	6/18/2018
3 NB	NB	4 HIT AND RI	12/11/2018
1 NB	NB	4	12/19/2018
1 WB	WB	6 HIT AND RI	3/1/2017
1 EB	EB	2	3/20/2018
3 EB	EB	4 MULTI VEH	3/27/2018

APPENDIX E

TRIP GENERATION CALCULATIONS

Palmerae

Phase 1

Trip Generation

July 2020

Appendix D

Methodology Overview

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual* and *Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the *Manual* when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

Box 1 - Define Study Site Land Use Type & Site Characteristics

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Retail	120.015 1,000 square feet	820	Shopping Center
Food & Beverage	48.055 1,000 square feet	932	High Turnover(Sit Down) Restaurant
Office	97.3 1,000 square feet	710	General Office Building

Baseline Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				Saturday			
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total
Retail	50%	3,089	3,089	6,178	62%	107	65	172	48%	276	299	575	52%	281	259	540
Food & Beverage	50%	2,695	2,695	5,390	55%	263	215	478	62%	291	178	469	53%	285	253	538
Office	50%	510	510	1,020	86%	94	15	109	16%	17	92	109	54%	28	24	52
Totals		6,294	6,294	12,588		464	295	759		584	569	1,153		594	536	1,130

Adjustments for Internal Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				Saturday			
	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total
Retail	20%	618	618	1,236	20%	21	13	34	20%	55	60	115	20%	56	52	108
Food & Beverage	20%	539	539	1,078	20%	53	43	96	20%	58	36	94	20%	57	51	108
Office	20%	102	102	204	20%	19	3	22	20%	3	19	22	20%	6	4	10
Totals	20%	1,259	1,259	2,518	20%	93	59	152	20%	116	115	231	20%	119	107	226

External Vehicular Trips

Proposed Use	ADT			AM Peak Hour			PM Peak Hour			Saturday		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Retail	2,471	2,471	4,942	86	52	138	221	239	460	225	207	432
Food & Beverage	2,156	2,156	4,312	210	172	382	233	142	375	228	202	430
Office	408	408	816	75	12	87	14	73	87	22	20	42
Totals	5,035	5,035	10,070	371	236	607	468	454	922	475	429	904

Palmerae

Phase 1 + Phase 2

Trip Generation

July 2020

Appendix D

Methodology Overview

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual* and *Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the *Manual* when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

Box 1 - Define Study Site Land Use Type & Site Characteristics

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Retail	162,396 1,000 square feet	820	Shopping Center
Food & Beverage	67,355 1,000 square feet	932	High Turnover(Sit Down) Restaurant
Office	145,237 1,000 square feet	710	General Office Building
Apartments	41 Dwelling Units	221	Multifamily Housing (Mid-Rise)
Hotel	150 Rooms	310	Hotel

Baseline Vehicular Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				Saturday			
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total
Retail	50%	4,180	4,180	8,360	62%	144	89	233	48%	373	405	778	52%	380	351	731
Food & Beverage	50%	3,778	3,778	7,556	55%	369	301	670	62%	408	250	658	51%	385	369	754
Office	50%	762	762	1,524	86%	140	23	163	16%	26	136	162	54%	42	35	77
Apartments	50%	111	111	222	26%	4	10	14	61%	12	7	19	54%	10	8	18
Hotel	50%	633	633	1,266	59%	41	29	70	51%	44	42	86	56%	60	48	108
Totals		9,464	9,464	18,928		698	452	1,150		863	840	1,703		877	811	1,688

Adjustments for Internal Trips

Proposed Use	ADT				AM Peak Hour				PM Peak Hour				Saturday			
	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total
Retail	20%	836	836	1,672	20%	29	18	47	20%	75	81	156	20%	76	70	146
Food & Beverage	20%	756	756	1,512	20%	74	60	134	20%	82	50	132	20%	77	74	151
Office	20%	152	152	304	20%	28	5	33	20%	5	27	32	20%	8	7	15
Apartments	0%	0	0	0	0%	0	0	0	0%	0	0	0	20%	2	2	4
Hotel	0%	0	0	0	0%	0	0	0	0%	0	0	0	20%	12	10	22
Totals		1,744	1,744	3,488		131	83	214		162	158	320	20%	175	163	338

External Vehicular Trips

Proposed Use	ADT			AM Peak Hour			PM Peak Hour			Saturday		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Retail	3,344	3,344	6,688	115	71	186	298	324	622	304	281	585
Food & Beverage	3,022	3,022	6,044	295	241	536	326	200	526	308	295	603
Office	610	610	1,220	112	18	130	21	109	130	34	28	62
Apartments	111	111	222	4	10	14	12	7	19	8	6	14
Hotel	633	633	1,266	41	29	70	44	42	86	48	38	86
Totals	7,720	7,720	15,440	567	369	936	701	682	1,383	702	648	1,350

APPENDIX F

BACKGROUND GROWTH CALCULATIONS

**MOUNTAIN SHADOWS RESORT
TRAFFIC IMPACT ANALYSIS
Submittal for June 26, 2007 Site Plan**

**Portion of Southeast Section 8, and Southwest Section 9
Township 2 North, Range 4 East**

**Prepared for:
Crown Realty and Development
18201 Von Karman Avenue
Suite 950
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(949) 476-2200**

By:

**CivTech, Inc.
8590 East Shea Boulevard
Suite 130
Scottsdale, Arizona 85260
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**August 2007
CivTech Project No. 05-380**

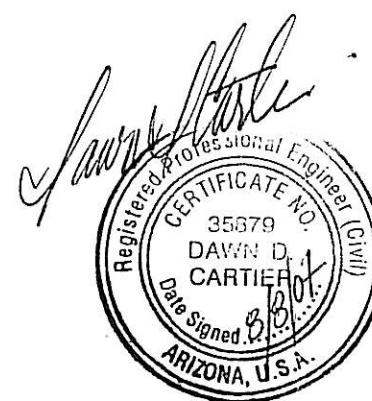
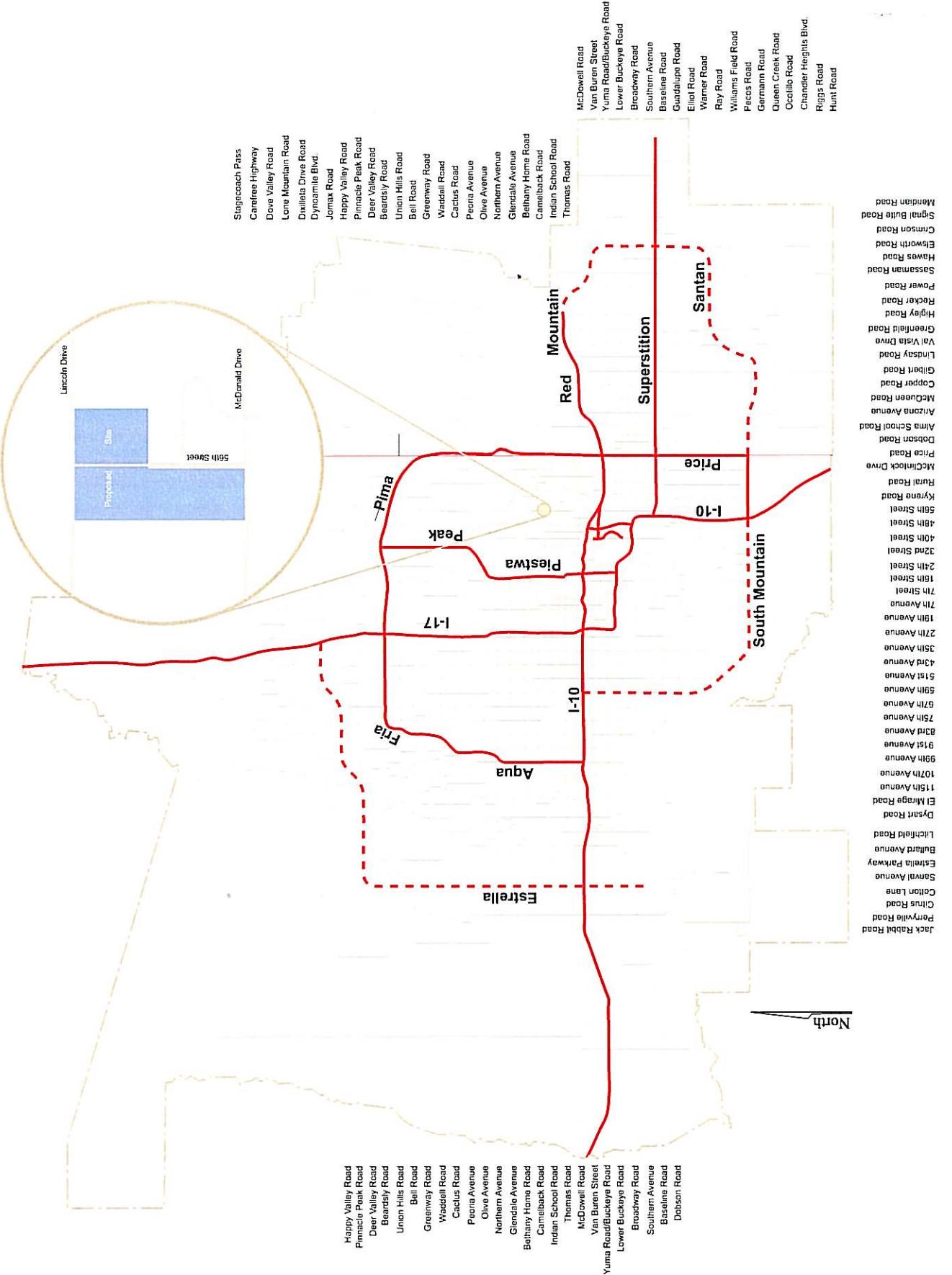


Figure 1:
Location Map



Mountain Shadows

Figure 4:
Site Plan



Mountain Shadows

7-ZN-2016#2
8/11/2020

TRIP GENERATION

The average daily traffic (ADT), AM peak hour and PM peak hour volumes have been estimated by trip rates given in the Institute of Transportation Engineers (ITE) *Trip Generation, 7th Edition*. Table 2 shows the trip generation established for this redevelopment. Detailed trip generation calculations for both the existing and planned redevelopment have been included in Appendix D. Average trip rates from ITE's *Trip Generation* were used in the calculation of site generated traffic.

To obtain a conservative estimate of the number of external trips generated by the site, interaction between the uses at the site was not considered.

Table 2 – Trip Generation

Proposed Use	ITE		Units	Total	AM Distribution		PM Distribution			
	LUC	Land Use			In	Out	In	Out		
<i>East Side of 56th St</i>	330	Resort Hotel	Rooms	200	72%	28%	43%	57%		
<hr/>										
<i>West Side of 56th St</i>										
Hotel Spa Suites	330	Resort Hotel	Rooms	120	72%	28%	43%	57%		
Resort Patio Homes	233	Attached Residential	Dwelling Units	26	23%	77%	63%	37%		
<hr/>										
Proposed Use	ADT		AM Peak Hour			PM Peak Hour				
	Avg Rate	Total	Avg Rate	Total	In	Out	Avg Rate	Total		
<i>East Side of 56th St</i>	6.24 ¹	1,248	0.37	74	53	21	0.49	98	42	56
<hr/>										
<i>West Side of 56th St</i>										
Hotel Spa Suites	6.24 ¹	750	0.37	45	32	13	0.49	59	24	34
Resort Patio Homes	5.86 ²	154	0.56	15	3	12	0.55	15	9	6
TOTALS		2,152		134	88	46		172	76	96

Notes: 1. In the absence of a published rate, this trip generation rate was taken from "All Suites Hotel" (LUC 311), a use considered in Trip Generation as related to a "Resort Hotel".

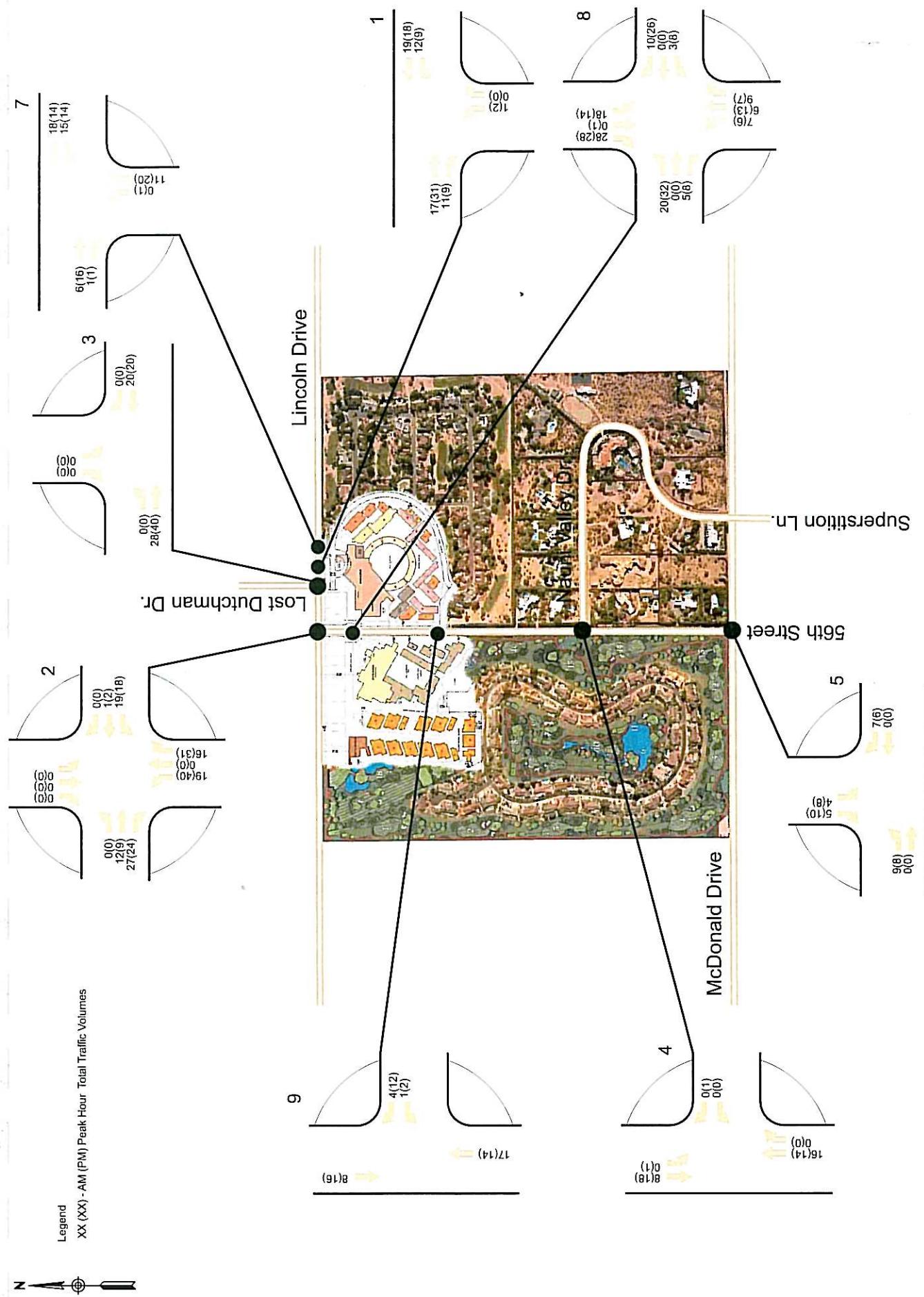
2. In the absence of a published rate, this trip generation rate was taken from "Residential Condominiums/Townhouses" (LUC 230) since these will be privately-owned units.

The resort patio homes have been studied herein as a residential land use, Luxury Condominium/Townhouse (ITE Land Use Code 233), with the daily rate taken from Residential Condominium/Townhouse (ITE LUC 230).

The hotel spa suites on the west side of 56th Street will be 90 units with a total of 120 keys. Although they will be privately-owned, they will be made available for rental through the hotel. Thus, for the purposes of this analysis, they are considered as being included in the hotel rental pool and are treated as 120 individual resort hotel rooms. This is a conservative approach as the multiple-key units will often operate as single-key units. Since there is no published ITE daily trip generation rate for a Resort Hotel, the daily trip generation rate for an "All Suites Hotel" (ITE LUC 311) was used. This rate was updated in the most recent version of the Trip Generation manual and varies from the value used in previous versions of this study.

Mountain Shadows

Figure 6:
Buildout Site Generated Traffic





Ritz Carlton Resort

Master Traffic Impact Analysis

Section 10, Township 2 North,
Range 4 East
Paradise Valley, AZ

March 2016
Project No. 15-360

Prepared For:
Five Star Development
6720 North Scottsdale Road
Suite 130
Scottsdale, Arizona 85253

For Submittal to:
Town of Paradise Valley

Prepared By:



10605 North Hayden Road
Suite 140
Scottsdale, Arizona 85260
480-659-4250

RITZ CARLTON RESORT MASTER TRAFFIC IMPACT ANALYSIS

**Section 10, Township 2 North, Range 4 East
Paradise Valley, AZ**

Prepared for:

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6720 North Scottsdale Road
Suite 130
Scottsdale, Arizona 85253

For Submittal to:

Town of Paradise Valley

Prepared By:



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March 2016

CivTech Project No: 15-360

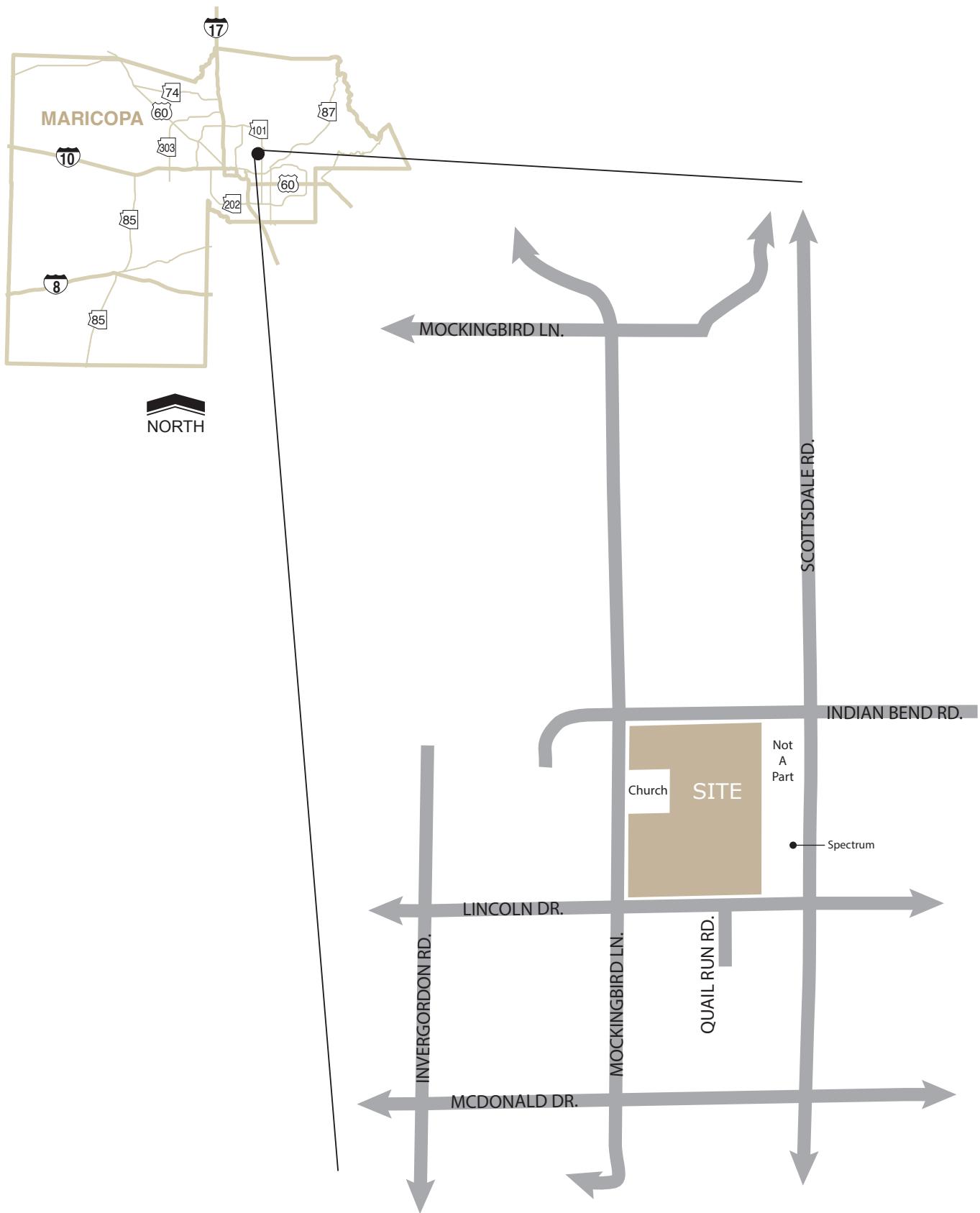


Figure I: Vicinity Map



Figure 4: Site Plan

Table 13 – Trip Generation

Phase	Parcel	Land Use	ITE	Size	Units	Daily	AM Peak Hour			PM Peak Hour		
						Total	In	Out	Total	In	Out	Total
1	A	Resort Hotel	330	200	Rooms	1,000	87	34	121	36	48	84
1	A1	Resort Hotel	330	94	Rooms	470	57	22	79	17	23	40
1	B	Homes	210	66	DU	718	14	42	56	46	27	73
1	C	Homes	210	45	DU	504	11	31	42	33	19	52
2	D	Attached Homes	230	55	DU	374	5	27	32	24	12	36
2	E1	Retail	230	50,592	SF	4,362	64	39	103	182	198	380
-	E2	Mixed Use (Deferred)										
Phase 1 Subtotals						2,692	169	129	298	132	117	249
<i>Internal Capture – not applied in 2018</i>						(-)	(-)	(-)	(-)	(-)	(-)	(-)
Phase 1 Total Trips						2,692	169	129	298	132	117	249
Phase 1 & Phase 2 Subtotals						7,426	238	195	433	338	327	665
<i>Internal Capture – 20%</i>						(1,486)	(48)	(39)	(87)	(68)	(65)	(133)
Phase 2 Total Trips						5,940	190	156	346	270	262	532

Phase 1 of the development is anticipated to generate 2,692 daily trips, of which 298 trips are during the AM peak hour and 429 trips are during the PM peak hour. Buildout of the development is anticipated to generate 5,940 daily trips, of which 346 trips are during the AM peak hour and 532 trips are during the PM peak hour.

Although Parcel E2 is deferred, it is expected that it will be proposed and constructed in the future. Based on the depicted land uses and square footages within the conceptual master plan, Parcel E2 is projected to generate approximately 5,570 daily trips, of which 241 trips are during the AM peak hour and 549 trips during the PM peak hour. These trips added to the trips generated by the proposed development result in approximately 11,520 daily trips which is slightly fewer than the previously proposed trip generation of 11,768 daily trips. The new site plan substantially reduces the number of residences, reducing the traffic generated by new residents, but also increases the size of the proposed grocery store. It may be noted that external trips to the grocery would be made predominantly by residents in the area preferring to shop at this grocery store rather than another location, resulting in fewer trips in the expanded region when compared to the previous site plan.

TRIP DISTRIBUTION

The Ritz Carlton development consists of multiple land uses. Trips were distributed based on the type of land use. For hotel related trips, most are anticipated to travel to/from Sky Harbor Airport with the remainder to nearby areas in downtown Scottsdale. For residential trips, employment opportunity within a 10-mile radius of the site, projected by Maricopa Association of Government (MAG) socioeconomic data, was considered. For resort related retail trips external to the site, the projected population within a 5-mile radius was considered. These distributions of socioeconomic data were used as a base for the distributions applied to the trips generated by the site. They were adjusted according to major roadways and likely travel routes such as Lincoln Drive, Scottsdale Road and Loop 101.

APPENDIX G

2023 PEAK HOUR ANALYSIS

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Background 2023 AM

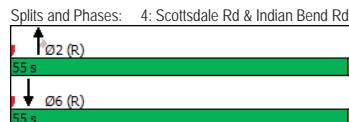
3: Indian Bend Rd. & Scottsdale Plaza Resort
HCM 6th Roundabout

Intersection				
Intersection Delay, s/veh	3.8			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	178	201	0	8
Demand Flow Rate, veh/h	181	205	0	8
Vehicles Circulating, veh/h	7	4	188	204
Vehicles Exiting, veh/h	205	184	0	5
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.7	3.9	0.0	3.3
Approach LOS	A	A	-	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	181	205	0	8
Cap Entry Lane, veh/h	1370	1374	1139	1121
Entry HV Adj Factor	0.981	0.980	1.000	1.000
Flow Entry, veh/h	178	201	0	8
Cap Entry, veh/h	1344	1347	1139	1121
V/C Ratio	0.132	0.149	0.000	0.007
Control Delay, s/veh	3.7	3.9	3.2	3.3
LOS	A	A	A	A
95th %tile Queue, veh	0	1	0	0

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Background 2023 AM

4: Scottsdale Rd & Indian Bend Rd.
Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	46	104	40	565	154	148	42	1250	388	154	1575
Future Volume (vph)	46	104	40	565	154	148	42	1250	388	154	1575
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases			4			8				2	
Detector Phase	7	4	4	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0
Minimum Split (s)	8.5	13.0	13.0	8.5	13.0	9.4	8.5	29.4	8.5	9.4	29.4
Total Split (s)	16.0	17.0	17.0	32.0	33.0	16.0	16.0	55.0	32.0	16.0	55.0
Total Split (%)	13.3%	14.2%	14.2%	26.7%	27.5%	13.3%	13.3%	45.8%	26.7%	13.3%	45.8%
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4
All-Red Time (s)	1.0	2.8	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	None	C-Max	None	None	C-Max						
Act Effct Green (s)	6.9	9.1	9.1	24.6	28.4	44.2	10.4	53.3	83.9	12.0	56.5
Actuated g/C Ratio	0.06	0.08	0.08	0.20	0.24	0.37	0.09	0.44	0.70	0.10	0.47
v/c Ratio	0.49	0.80	0.18	0.87	0.38	0.24	0.15	0.60	0.37	0.94	0.74
Control Delay	70.0	91.1	1.7	60.0	41.5	6.1	47.1	14.5	1.3	108.4	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.0	91.1	1.7	60.0	41.5	6.1	47.1	14.5	1.3	108.4	29.9
LOS	E	F	A	E	D	A	D	B	A	F	C
Approach Delay		67.3			47.5			12.3			36.7
Approach LOS		E			D			B			D
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 80											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.94											
Intersection Signal Delay: 31.0								Intersection LOS: C			
Intersection Capacity Utilization 73.9%								ICU Level of Service D			
Analysis Period (min) 15											



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4: Scottsdale Rd & Indian Bend Rd.
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBC	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑	↑↑	↑	↑↑		
Traffic Volume (veh/h)	46	104	40	565	154	148	42	1250	388	154	1575	45	
Future Volume (veh/h)	46	104	40	565	154	148	42	1250	388	154	1575	45	
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No												
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	50	113	43	614	167	161	46	1359	422	167	1712	49	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	64	143	121	673	486	603	417	2085	956	215	2083	60	
Arrive On Green	0.04	0.08	0.08	0.19	0.26	0.26	0.24	0.82	0.82	0.12	0.41	0.41	
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	3456	5106	1585	1781	5102	146	
Grp Volume(v), veh/h	50	113	43	614	167	161	46	1359	422	167	1142	619	
Grp Sat Flow(s), veh/h/in	1781	1870	1585	1728	1870	1585	1728	1702	1585	1781	1702	1844	
O Serve(g_s), s	3.3	7.1	3.1	20.9	8.7	0.9	1.2	12.5	0.0	10.9	35.8	35.9	
Cyc/Q Clear(g_c), s	3.3	7.1	3.1	20.9	8.7	0.9	1.2	12.5	0.0	10.9	35.8	35.9	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.08	
Lane Grp Cap(c), veh/h	64	143	121	673	486	603	417	2085	956	215	1390	753	
V/C Ratio(X)	0.78	0.79	0.36	0.91	0.34	0.27	0.11	0.65	0.44	0.78	0.82	0.82	
Avail Cap(c_a), veh/h	178	156	132	806	486	603	417	2085	956	215	1390	753	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	57.4	54.5	52.6	47.3	36.1	14.4	40.5	7.7	3.2	51.2	31.6	31.6	
Incr Delay (d2), s/veh	7.3	19.7	0.7	11.9	0.2	0.1	0.0	1.6	1.5	15.1	5.6	9.8	
Initial O Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOf(95%), veh/in	2.9	7.4	2.3	15.3	7.2	4.0	1.0	5.2	3.4	9.7	22.0	24.6	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	64.6	74.2	53.3	59.2	36.2	14.4	40.6	9.3	4.7	66.3	37.2	41.5	
LnGrp LOS	E	E	D	E	D	B	D	A	A	E	D	D	
Approach Vol, veh/h	206			942			1827			1928			
Approach Delay, s/veh	67.5			47.5			9.0			41.1			
Approach LOS	E			D			A			D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+R _c), s	18.5	55.0	30.4	16.1	18.5	55.0	8.3	38.2					
Change Period (Y+R _c), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7					
Max Green Setting (Gmax), s	* 12	49.0	* 28	* 10	* 12	49.0	12.0	* 26					
Max O Clear Time (g _{c+11}), s	12.9	14.5	22.9	9.1	3.2	37.9	5.3	10.7					
Green Ext Time (p _c), s	0.0	2.2	0.5	0.0	0.0	2.4	0.0	0.8					
Intersection Summary													
HCM 6th Ctrl Delay				31.5									
HCM 6th LOS				C									
Notes													
User approved pedestrian interval to be less than phase max green.													
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.													

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Background 2023 AM

5: Scottsdale Rd & Joshua Tree Ln
HCM 6th TWSC

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	4	1	2061	
Traffic Vol, veh/h	3	5	1653	4	1	2061
Future Vol, veh/h	3	5	1653	4	1	2061
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	5	1797	4	1	2240
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	2697	901	0	0	1801	0
Stage 1	1799	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	39	241	-	-	158	-
Stage 1	76	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver	39	241	-	-	158	-
Mov Cap-2 Maneuver	39	-	-	-	-	-
Stage 1	76	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	54	0	0			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	82	158	-	
HCM Lane V/C Ratio	-	-	0.106	0.007	-	
HCM Control Delay (s)	-	-	54	27.9	-	
HCM Lane LOS	-	-	F	D	-	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	

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Background 2023 AM

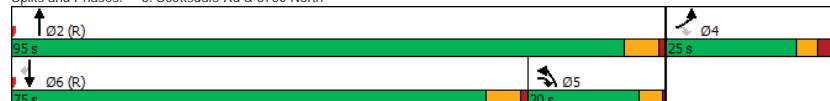
6: Scottsdale Rd & 6750 North
Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Traffic Volume (vph)	27	15	74	1593	2113	106
Future Volume (vph)	27	15	74	1593	2113	106
Turn Type	Prot.	pm+ov	Prot.	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases			4			6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	8.0	8.0	36.0	36.9	36.9
Total Split (s)	25.0	20.0	20.0	95.0	75.0	75.0
Total Split (%)	20.8%	16.7%	16.7%	79.2%	62.5%	62.5%
Yellow Time (s)	3.0	3.5	3.5	4.9	4.9	4.9
All-Red Time (s)	3.0	0.5	0.5	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	6.6	22.3	14.1	108.3	91.1	91.1
Actuated g/C Ratio	0.06	0.19	0.12	0.90	0.76	0.76
v/c Ratio	0.30	0.05	0.38	0.38	0.60	0.09
Control Delay	61.7	28.7	71.0	3.5	15.0	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	28.7	71.0	3.5	15.0	7.7
LOS	E	C	E	A	B	A
Approach Delay	50.0			6.5	14.6	
Approach LOS	D			A	B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 11.6
Intersection LOS: B
Intersection Capacity Utilization 62.4%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Scottsdale Rd & 6750 North



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6: Scottsdale Rd & 6750 North
HCM 6th Signalized Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	27	15	74	1593	2113	106
Future Volume (veh/h)	27	15	74	1593	2113	106
Initial Q (Q _b) veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	29	16	80	1732	2297	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	58	436	432	4430	2936	911
Arrive On Green	0.03	0.03	0.32	1.00	1.00	1.00
Sat Flow, veh/h	1781	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	29	16	80	1732	2297	115
Grp Sat Flow(s), veh/h/ln	1781	1585	1781	1702	1702	1585
Q Serve(g_s), s	1.9	0.0	3.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.9	0.0	3.9	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	58	436	432	4430	2936	911
V/C Ratio(X)	0.50	0.04	0.19	0.39	0.78	0.13
Avail Cap(c_a), veh/h	282	636	432	4430	2936	911
HCM Platooning Ratio	1.00	1.00	1.33	1.33	2.00	2.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	31.9	32.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.5	0.0	0.2	0.3	2.2	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.6	1.0	3.0	0.2	1.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	59.6	31.9	32.3	0.3	2.2	0.3
LnGrp LOS	E	C	C	A	A	A
Approach Vol, veh/h	45			1812	2412	
Approach Delay, s/veh	49.8			1.7	2.1	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4	5	6	
Ph Duration (G+Y+R _c), s	110.1		9.9	35.1	75.0	
Change Period (Y+R _c), s	* 6		6.0	* 6	* 6	
Max Green Setting (Gmax), s	* 89		19.0	* 16	* 69	
Max Q Clear Time (g_c+11), s	2.0		3.9	5.9	2.0	
Green Ext Time (p_c), s	3.4		0.0	0.1	5.3	
Intersection Summary						
HCM 6th Ctrl Delay				2.4		
HCM 6th LOS				A		
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Background 2023 AM

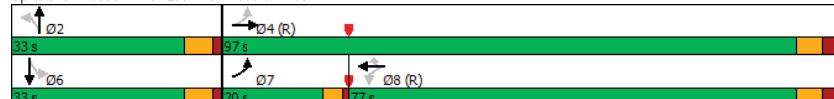
10: Quail Run Road & Lincoln Dr
Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑	↑↓
Traffic Volume (vph)	163	1077	5	1175	6	5	0	8	0
Future Volume (vph)	163	1077	5	1175	6	5	0	8	0
Turn Type	pm+pl	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	7	4	8	8	2		2	6	6
Permitted Phases	4		8	8	2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	8.0	28.0	28.0	28.0	33.0	33.0	33.0	33.0	
Total Split (s)	20.0	97.0	77.0	77.0	33.0	33.0	33.0	33.0	
Total Split (%)	15.4%	74.6%	59.2%	59.2%	25.4%	25.4%	25.4%	25.4%	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	
All-Red Time (s)	1.0	2.5	2.5	2.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	112.8	110.3	98.3	98.3	98.3	7.2	7.2	7.2	
Actuated g/C Ratio	0.87	0.85	0.76	0.76	0.76	0.06	0.06	0.06	
v/c Ratio	0.46	0.39	0.01	0.48	0.01	0.08	0.12	0.31	
Control Delay	5.3	2.7	4.6	6.9	0.0	1.2	61.5	2.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.3	2.7	4.6	6.9	0.0	1.2	61.5	2.5	
LOS	A	A	A	A	A	A	E	A	
Approach Delay	3.0		6.9			1.2		7.6	
Approach LOS	A		A			A		A	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 107 (82%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 5.0
Intersection LOS: A
Intersection Capacity Utilization 64.1%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 10: Quail Run Road & Lincoln Dr



Palmerae
Background 2023 AM

10: Quail Run Road & Lincoln Dr
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓	↑	↑↓	↑↓	↑	↑↓	↑	↑↓	
Traffic Volume (veh/h)	163	1077	5	5	1175	6	5	0	5	8	0	88
Future Volume (veh/h)	163	1077	5	5	1175	6	5	0	5	8	0	88
Initial Q (Q _b) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	177	1171	5	5	1277	7	5	0	5	9	0	96
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	392	3000	13	410	2691	1200	54	13	25	152	0	122
Arrive On Green	0.04	0.83	0.83	0.76	0.76	0.76	0.08	0.00	0.08	0.08	0.00	0.08
Sat Flow, veh/h	1781	3629	15	477	3554	1585	163	166	329	1411	0	1585
Grp Volume(v), veh/h	177	573	603	5	1277	7	10	0	0	9	0	96
Grp Sat Flow(s), veh/h/ln	1781	1777	1868	477	1777	1585	658	0	0	1411	0	1585
Q Serve(g_s), s	2.7	10.7	10.7	0.4	17.7	0.1	0.0	0.0	0.0	0.0	0.0	7.7
Cycle Q Clear(g_c), s	2.7	10.7	10.7	2.0	17.7	0.1	7.8	0.0	0.0	0.9	0.0	7.7
Prop In Lane	1.00		0.01	1.00		1.00	0.50		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	392	1469	1544	410	2691	1200	92	0	0	152	0	122
V/C Ratio(X)	0.45	0.39	0.39	0.01	0.47	0.01	0.11	0.00	0.00	0.06	0.00	0.79
Avail Cap(c_a), veh/h	542	1469	1544	410	2691	1200	279	0	0	336	0	329
HCM Platoated Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.76	0.76	0.76	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.1	2.9	2.9	4.3	6.0	3.8	55.8	0.0	0.0	55.8	0.0	58.9
Incr Delay (d2), s/veh	0.8	0.8	0.7	0.0	0.5	0.0	0.5	0.0	0.0	0.2	0.0	10.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	1.6	5.7	6.0	0.1	9.5	0.1	0.6	0.0	0.5	0.0	6.2	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.9	3.7	3.6	4.3	6.4	3.9	56.3	0.0	0.0	55.9	0.0	69.5
LnGrp LOS	A	A	A	A	A	A	E	A	A	E	A	E
Approach Vol, veh/h		1353			1289			10		105		
Approach Delay, s/veh		3.9			6.4			56.3		68.3		
Approach LOS		A			A			E		E		
Timer - Assigned Phs		2		4		6	7	8				
Ph Duration (G+Y+R _c), s		16.0		114.0		16.0	9.0	104.9				
Change Period (Y+R _c), s		6.0		6.5		6.0	4.0	6.5				
Max Green Setting (Gmax), s		27.0		90.5		27.0	16.0	70.5				
Max Q Clear Time (g_c+11), s		9.8		12.7		9.7	4.7	19.7				
Green Ext Time (p_c), s		0.0		11.0		0.4	0.3	14.0				
Intersection Summary												
HCM 6th Ctrl Delay							7.7					
HCM 6th LOS							A					

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Background 2023 AM

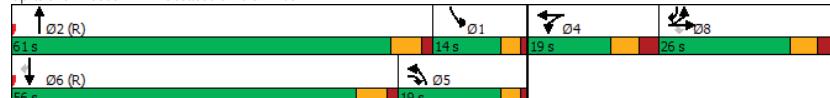
11: Scottsdale Rd & Lincoln Dr
Timings

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑↓	↑	↑↓	↑	↑↓	↑
Traffic Volume (vph)	582	46	394	25	33	293	1176	30	1686	605
Future Volume (vph)	582	46	394	25	33	293	1176	30	1686	605
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases										6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0	8.0
Minimum Split (s)	40.0	40.0	9.0	40.0	40.0	9.0	28.0	9.0	28.0	40.0
Total Split (s)	26.0	26.0	19.0	19.0	19.0	61.0	14.0	56.0	26.0	
Total Split (%)	21.7%	21.7%	15.8%	15.8%	15.8%	50.8%	11.7%	46.7%	21.7%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
Act Effct Green (s)	28.0	28.0	45.7	6.5	6.5	13.9	59.5	8.0	50.0	84.0
Actuated g/C Ratio	0.23	0.23	0.38	0.05	0.05	0.12	0.50	0.07	0.42	0.70
v/c Ratio	0.87	0.86	0.61	0.28	0.38	0.80	0.52	0.28	0.87	0.54
Control Delay	69.2	67.7	19.0	61.3	31.6	67.2	22.1	59.3	48.6	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.2	67.7	19.0	61.3	31.6	67.2	22.1	59.3	48.6	13.9
LOS	E	E	B	E	C	E	C	E	D	B
Approach Delay	49.4			38.8		30.9		39.7		
Approach LOS	D			D		C		D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 90 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 39.0
Intersection Capacity Utilization 79.1%
Analysis Period (min) 15

Splits and Phases: 11: Scottsdale Rd & Lincoln Dr



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11: Scottsdale Rd & Lincoln Dr
HCM Signaled Intersection Capacity Analysis

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑↓	↑
Traffic Volume (vph)	582	46	394	25	33	44	293	1176	29	30	1686	605
Future Volume (vph)	582	46	394	25	33	44	293	1176	29	30	1686	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.97	0.91	1.00	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.85	
Flt Protected	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satl. Flow (prot)	1681	1697	1583	1770	3236	3433	5067	1770	5085	1583		
Flt Permitted	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satl. Flow (perm)	1681	1697	1583	1770	3236	3433	5067	1770	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	633	50	428	27	36	48	318	1278	32	33	1833	658
RTOR Reduction (vph)	0	0	97	0	46	0	0	2	0	0	0	147
Lane Group Flow (vph)	342	341	331	27	38	0	318	1308	0	33	1833	511
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov		
Protected Phases	8	8	5	4	4	4	5	2	1	6	8	
Permitted Phases												6
Actuated Green, G (s)	28.0	28.0	43.5	5.5	5.5	15.5	56.5	6.0	47.0	75.0		
Effective Green, g (s)	28.0	28.0	43.5	5.5	5.5	15.5	56.5	6.0	47.0	75.0		
Actuated g/C Ratio	0.23	0.23	0.36	0.05	0.05	0.13	0.47	0.05	0.39	0.62		
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0		
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0	1.0	0.2	1.0	0.2	1.0	0.2	2.0
Lane Grp Cap (vph)	392	395	573	81	148	443	2385	88	1991	1081		
v/s Ratio Prot	c0.20	0.20	0.07	c0.02	0.01	c0.09	0.26	0.02	c0.36	0.11		
v/s Ratio Perm			0.13							0.21		
v/c Ratio	0.87	0.86	0.58	0.33	0.26	0.72	0.55	0.38	0.92	0.47		
Uniform Delay, d1	44.3	44.2	30.8	55.5	55.3	50.2	22.6	55.2	34.7	12.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.37	3.36	
Incremental Delay, d2	18.3	16.9	0.9	0.9	0.3	4.6	0.9	0.9	7.6	0.1		
Delay (s)	62.5	61.1	31.7	56.4	55.6	54.7	23.6	57.8	55.2	40.4		
Level of Service	E	E	C	E	E	D	C	E	E	D		
Approach Delay (s)	50.2			55.8		29.7		51.3				
Approach LOS	D			E		C		D				

Intersection Summary
HCM 2000 Control Delay 44.6
HCM 2000 Volume to Capacity ratio 0.84
Actuated Cycle Length (s) 120.0
Intersection Capacity Utilization 79.1%
Analysis Period (min) 15
c = Critical Lane Group

Palmerae
Background 2023 AM

14: Street A (Access A) & Indian Bend Rd.
HCM 6th TWSC

Intersection							
Int Delay, s/veh	2						
Movement	EBT	EBC	WBL	WBT	NBL	NBR	
Lane Configurations	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	
Traffic Vol, veh/h	131	24	36	149	19	33	
Future Vol, veh/h	131	24	36	149	19	33	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	0	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	142	26	39	162	21	36	
Major/Minor							
Major1	Major2	Minor1					
Conflicting Flow All	0	0	168	0	395	155	
Stage 1	-	-	-	-	155	-	
Stage 2	-	-	-	-	240	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1410	-	610	891	
Stage 1	-	-	-	-	873	-	
Stage 2	-	-	-	-	800	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	1410	-	592	891	
Mov Cap-2 Maneuver	-	-	-	-	592	-	
Stage 1	-	-	-	-	847	-	
Stage 2	-	-	-	-	800	-	
Approach							
EB	WB	NB					
HCM Control Delay, s	0	1.5	10				
HCM LOS			B				
Minor Lane/Major Mvmt							
NBLn1	NBLn2	EBT	EBC	WBL	WBT		
Capacity (veh/h)	592	891	-	-	1410	-	
HCM Lane V/C Ratio	0.035	0.04	-	-	0.028	-	
HCM Control Delay (s)	11.3	9.2	-	-	7.6	0	
HCM Lane LOS	B	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-	

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15: Scottsdale Rd & Street B (Access B)
HCM 6th TWSC

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBC	NBL	NBT	SBT	SBR	
Lane Configurations	↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	1	0	1680	1763	4	
Future Vol, veh/h	0	1	0	1680	1763	4	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	1	0	1826	1916	4	
Major/Minor							
Minor2	Major1					Major2	
Conflicting Flow All	-	960	-	0	-	0	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Critical Hdwy	-	7.14	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	3.92	-	-	-	-	
Pot Cap-1 Maneuver	0	221	0	-	-	-	
Stage 1	0	-	0	-	-	-	
Stage 2	0	-	0	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	221	-	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Approach							
EB	WB	NB					
HCM Control Delay, s	21.4		0				
HCM LOS	C						
Minor Lane/Major Mvmt							
NBT	EBLn1	SBT	SBR				
Capacity (veh/h)	-	221	-	-	-	-	
HCM Lane V/C Ratio	-	0.005	-	-	-	-	
HCM Control Delay (s)	-	21.4	-	-	-	-	
HCM Lane LOS	-	C	-	-	-	-	
HCM 95th %tile Q(veh)	-	0	-	-	-	-	

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16: Scottsdale Rd & Tuckey Ln
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑↑		Y	↑↑↑
Traffic Vol, veh/h	3	10	1623	2	8	1965
Future Vol, veh/h	3	10	1623	2	8	1965
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	125	-	
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	11	1764	2	9	2136
Major/Minor						
Minor1		Major1		Major2		
Conflicting Flow All	2637	883	0	0	1766	0
Stage 1	1765	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	42	248	-	-	164	-
Stage 1	80	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	40	248	-	-	164	-
Mov Cap-2 Maneuver	40	-	-	-	-	-
Stage 1	76	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, s	41.4	0	0	0.1		
HCM LOS	E					
Minor Lane/Major Mvmt						
NBT		NBR		WBLn1		
Capacity (veh/h)	-	-	113	164	-	
HCM Lane V/C Ratio	-	-	0.125	0.053	-	
HCM Control Delay (s)	-	-	41.4	28.2	-	
HCM Lane LOS	-	-	E	D	-	
HCM 95th %tile Q(veh)	-	-	0.4	0.2	-	

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Intersection							
Int Delay, s/veh	3						
Movement	EBL	EBT	EBR	WBL	WBR	NBL	
Lane Configurations	Y	↑	2	6	15	19	
Traffic Vol, veh/h	3	9	2	6	15	19	
Future Vol, veh/h	3	9	2	6	15	19	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Stop	
RT Channelized	-	-	-	-	-	-	
Storage Length	75	-	-	100	-	-	
Veh in Median Storage, #	-	0	-	0	-	0	
Grade, %	-	0	-	0	-	0	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	3	10	2	7	16	21	
Major/Minor							
Major1		Major2		Minor1		Minor2	
Conflicting Flow All	37	0	0	12	0	0	58
Stage 1	-	-	-	-	-	-	17
Stage 2	-	-	-	-	-	-	41
Critical Hdwy	4.12	-	-	4.12	-	-	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518
Pot Cap-1 Maneuver	1574	-	-	1607	-	-	939
Stage 1	-	-	-	-	-	-	1002
Stage 2	-	-	-	-	-	-	974
Platoon blocked, %	-	-	-	-	-	-	880
Mov Cap-1 Maneuver	1574	-	-	1607	-	-	933
Mov Cap-2 Maneuver	-	-	-	-	-	-	933
Stage 1	-	-	-	-	-	-	1000
Stage 2	-	-	-	-	-	-	969
Approach							
EB		WB		NB		SB	
HCM Control Delay, s	1.6			1.1			8.5
HCM LOS					A		A
Minor Lane/Major Mvmt							
NBLn1		EBL		EBT			
Capacity (veh/h)	1020	1574	-	1607	-	-	938
HCM Lane V/C Ratio	0.003	0.002	-	-	0.004	-	0.015
HCM Control Delay (s)	8.5	7.3	-	7.2	-	-	8.9
HCM Lane LOS	A	A	-	-	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	0

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3: Indian Bend Rd. & Scottsdale Plaza Resort
HCM 6th Roundabout

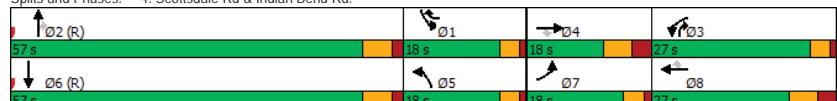
Intersection				
Intersection Delay, s/veh	4.3			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	234	286	0	8
Demand Flow Rate, veh/h	239	291	0	8
Vehicles Circulating, veh/h	4	4	243	275
Vehicles Exiting, veh/h	279	239	0	20
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.1	4.4	0.0	3.5
Approach LOS	A	A	-	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	239	291	0	8
Cap Entry Lane, veh/h	1374	1374	1077	1042
Entry HV Adj Factor	0.981	0.981	1.000	1.000
Flow Entry, veh/h	234	286	0	8
Cap Entry, veh/h	1348	1349	1077	1042
V/C Ratio	0.174	0.212	0.000	0.008
Control Delay, s/veh	4.1	4.4	3.3	3.5
LOS	A	A	A	A
95th %tile Queue, veh	1	1	0	0

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4: Scottsdale Rd & Indian Bend Rd.
Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	113	166	72	432	206	132	109	1817	487	182	1509
Future Volume (vph)	113	166	72	432	206	132	109	1817	487	182	1509
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases			4			8				2	
Detector Phase	7	4	4	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0
Minimum Split (s)	8.5	13.0	13.0	8.5	13.0	9.4	9.5	29.4	8.5	9.4	29.4
Total Split (s)	18.0	18.0	18.0	27.0	27.0	18.0	18.0	57.0	27.0	18.0	57.0
Total Split (%)	15.0%	15.0%	15.0%	22.5%	22.5%	15.0%	15.0%	47.5%	22.5%	15.0%	47.5%
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4
All-Red Time (s)	1.0	2.8	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	None	C-Max	None	None	C-Max						
Act Effct Green (s)	11.1	11.0	11.0	19.9	19.7	36.7	14.0	54.1	80.0	14.0	54.1
Actuated g/C Ratio	0.09	0.09	0.09	0.17	0.16	0.31	0.12	0.45	0.67	0.12	0.45
v/c Ratio	0.75	1.06	0.30	0.83	0.73	0.26	0.29	0.86	0.49	0.96	0.77
Control Delay	79.4	137.5	4.6	61.1	62.6	8.9	51.4	22.7	4.2	106.5	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	137.5	4.6	61.1	62.6	8.9	51.4	22.7	4.2	106.5	30.8
LOS	E	F	A	E	E	A	D	C	A	F	C
Approach Delay		91.5				52.6			20.2		38.5
Approach LOS		F			D			C		D	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.06											
Intersection Signal Delay: 35.8								Intersection LOS: D			
Intersection Capacity Utilization 83.8%								ICU Level of Service E			
Analysis Period (min) 15											

Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.



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4: Scottsdale Rd & Indian Bend Rd.
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBC	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑↑	↑	↑	↑↑	
Traffic Volume (veh/h)	113	166		72	432	206	132	109	1817	487	182	1509
Future Volume (veh/h)	113	166		72	432	206	132	109	1817	487	182	1509
Initial Q (Q _b), veh	0	0		0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A _{pbT})	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No		No		No	
Adj Sat Flow, veh/h/in	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	123	180		78	470	224	143	118	1975	529	198	1640
Peak Hour Factor	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2		2	2	2	2	2	2	2	2	2
Cap, veh/h	149	171		145	529	348	502	450	2170	916	232	2077
Arrive On Green	0.08	0.09		0.09	0.15	0.19	0.19	0.26	0.85	0.85	0.13	0.43
Sat Flow, veh/h	1781	1870		1585	3456	1870	1585	3456	5106	1585	1781	4888
Grp Volume(v), veh/h	123	180		78	470	224	143	118	1975	529	198	1142
Grp Sat Flow(s), veh/h/in	1781	1870		1585	1728	1870	1585	1728	1702	1585	1781	1702
O Serve(g _s), s	8.2	11.0		5.6	16.0	13.3	1.4	3.3	30.8	0.0	13.1	34.8
Cyclo Q Clear(g _c), s	8.2	11.0		5.6	16.0	13.3	1.4	3.3	30.8	0.0	13.1	34.8
Prop In Lane	1.00			1.00	1.00		1.00	1.00		1.00	1.00	0.18
Lane Grp Cap(c), veh/h	149	171		145	529	348	502	450	2170	916	232	1447
V/C Ratio(X)	0.83	1.05		0.54	0.89	0.64	0.28	0.26	0.91	0.58	0.85	0.79
Avail Cap(c _a), veh/h	208	171		145	662	348	502	450	2170	916	232	1447
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(l)	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.1	54.5		52.1	49.8	45.1	15.8	39.8	7.5	3.1	51.1	29.8
Incr Delay (d ₂), s/veh	12.5	82.5		2.1	10.5	3.1	0.1	0.1	7.1	2.6	24.0	4.4
Initial O Delay(d ₃), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOf(50%), veh/in	4.2	9.1		2.3	7.7	6.5	2.0	1.4	4.5	2.4	7.4	14.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	66.7	137.0		54.2	60.3	48.3	15.9	39.9	14.6	5.7	75.1	34.3
LnGrp LOS	E	F		D	E	D	B	D	B	A	E	D
Approach Vol, veh/h	381				837			2622			1948	
Approach Delay, s/veh	97.3				49.5			14.0			39.6	
Approach LOS	F				D			B			D	
Timer - Assigned Phs	1	2		3	4	5	6	7	8			
Phs Duration (G+Y+R _c), s	19.6	57.0		25.4	18.0	19.6	57.0	14.0	29.4			
Change Period (Y+R _c), s	* 4	6.0		* 7	* 7	* 4	6.0	4.0	* 7			
Max Green Setting (Gmax), s	* 14	51.0		* 23	* 11	* 14	51.0	14.0	* 20			
Max O Clear Time (g _{c+11}), s	15.1	32.8		18.0	13.0	5.3	36.9	10.2	15.3			
Green Ext Time (p _c), s	0.0	3.7		0.4	0.0	0.0	2.6	0.0	0.5			
Intersection Summary												
HCM 6th Ctrl Delay					33.2							
HCM 6th LOS					C							
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

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5: Scottsdale Rd & Joshua Tree Ln
HCM 6th TWSC

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	6	9	2100	
Traffic Vol, veh/h	5	5	2383	6	9	2100
Future Vol, veh/h	5	5	2383	6	9	2100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	2590	7	10	2283
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	3527	1299	0	0	2597	0
Stage 1	2594	-	-	-	-	-
Stage 2	933	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	13	131	-	-	62	-
Stage 1	23	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver	11	131	-	-	62	-
Mov Cap-2 Maneuver	11	-	-	-	-	-
Stage 1	19	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, \$§ 315.9		0	0.3			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	20	62	-	
HCM Lane V/C Ratio	-	-	0.543	0.158	-	
HCM Control Delay (s)	-	\$ 315.9	73.6	-	-	
HCM Lane LOS	-	-	F	F	-	
HCM 95th %tile Q(veh)	-	-	1.5	0.5	-	
Notes						
*: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon			

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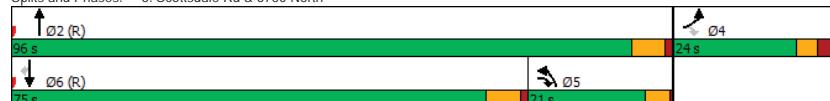
6: Scottsdale Rd & 6750 North
Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Traffic Volume (vph)	85	105	72	2299	2141	30
Future Volume (vph)	85	105	72	2299	2141	30
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases						6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	8.0	8.0	36.0	36.9	36.9
Total Split (s)	24.0	21.0	21.0	96.0	75.0	75.0
Total Split (%)	20.0%	17.5%	17.5%	80.0%	62.5%	62.5%
Yellow Time (s)	3.0	3.5	3.5	4.9	4.9	4.9
All-Red Time (s)	3.0	0.5	0.5	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	10.6	33.6	17.0	97.4	76.4	76.4
Actuated g/C Ratio	0.09	0.28	0.14	0.81	0.64	0.64
v/c Ratio	0.59	0.26	0.31	0.61	0.72	0.03
Control Delay	67.2	33.1	58.0	8.6	22.5	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	33.1	58.0	8.6	22.5	11.6
LOS	E	C	E	A	C	B
Approach Delay	48.3			10.0	22.4	
Approach LOS	D			B	C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 17.2
Intersection LOS: B
Intersection Capacity Utilization 63.4%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Scottsdale Rd & 6750 North



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6: Scottsdale Rd & 6750 North
HCM 6th Signalized Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	85	105	72	2299	2141	30
Future Volume (veh/h)	85	105	72	2299	2141	30
Initial Q (Q _b) veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	114	78	2499	2327	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	123	436	367	4242	2936	911
Arrive On Green	0.07	0.07	0.21	0.83	0.57	0.57
Sat Flow, veh/h	1781	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	92	114	78	2499	2327	33
Grp Sat Flow(s), veh/h/in	1781	1585	1781	1702	1702	1585
Q Serve(g_s), s	6.1	0.0	4.4	19.5	42.7	1.1
Cycle Q Clear(g_c), s	6.1	0.0	4.4	19.5	42.7	1.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	123	436	367	4242	2936	911
V/C Ratio(X)	0.75	0.26	0.21	0.59	0.79	0.04
Avail Cap(c_a), veh/h	267	564	367	4242	2936	911
HCM Platoated Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.8	34.0	39.6	3.4	19.9	11.1
Incr Delay (d2), s/veh	3.4	0.1	0.3	0.6	2.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/in	2.8	3.8	2.0	4.7	16.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	58.2	34.1	39.9	4.0	22.2	11.1
LnGrp LOS	E	C	D	A	C	B
Approach Vol, veh/h	206			2577	2360	
Approach Delay, s/veh	44.9			5.1	22.0	
Approach LOS		D		A	C	
Timer - Assigned Phs		2	4	5	6	
Ph Duration (G+Y+R _c), s		105.7	14.3	30.7	75.0	
Change Period (Y+R _c), s		* 6	6.0	* 6	* 6	
Max Green Setting (Gmax), s		* 90	18.0	* 17	* 69	
Max Q Clear Time (g_c+11), s		21.5	8.1	6.4	44.7	
Green Ext Time (p_c), s		6.4	0.2	0.1	5.3	
Intersection Summary						
HCM 6th Ctrl Delay				14.4		
HCM 6th LOS				B		
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Background 2023 PM

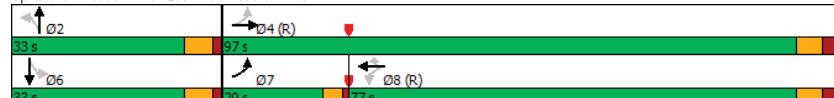
10: Quail Run Road & Lincoln Dr
Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑	↑↓
Traffic Volume (vph)	130	541	5	923	9	5	0	6	0
Future Volume (vph)	130	541	5	923	9	5	0	6	0
Turn Type	pm+pl	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	7	4	8	8	2		2	6	6
Permitted Phases	4		8	8	2		6		
Detector Phase	7	4	8	8	2	2	6	6	
Switch Phase									
Minimum Initial (s)	4.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	8.0	28.0	28.0	28.0	33.0	33.0	33.0	33.0	
Total Split (s)	20.0	97.0	77.0	77.0	33.0	33.0	33.0	33.0	
Total Split (%)	15.4%	74.6%	59.2%	59.2%	25.4%	25.4%	25.4%	25.4%	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	
All-Red Time (s)	1.0	2.5	2.5	2.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	112.9	110.4	99.4	99.4	99.4	7.1	7.1	7.1	
Actuated g/C Ratio	0.87	0.85	0.76	0.76	0.76	0.05	0.05	0.05	
v/c Ratio	0.29	0.20	0.01	0.37	0.01	0.10	0.09	0.44	
Control Delay	2.8	1.9	4.0	5.5	0.0	2.0	61.0	3.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	2.8	1.9	4.0	5.5	0.0	2.0	61.0	3.9	
LOS	A	A	A	A	A	A	E	A	
Approach Delay	2.1		5.5		2.0		6.4		
Approach LOS	A		A		A		A		

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 4.2
Intersection LOS: A
Intersection Capacity Utilization 55.1%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 10: Quail Run Road & Lincoln Dr



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10: Quail Run Road & Lincoln Dr
HCM 6th Signaled Intersection Summary

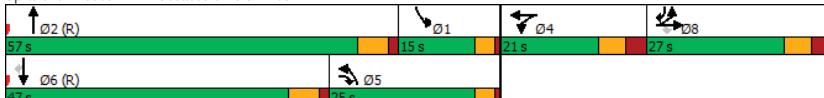
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑↓
Traffic Volume (veh/h)	130	541	5	5	923	9	5	0	5	6	0	140
Future Volume (veh/h)	130	541	5	5	923	9	5	0	5	6	0	140
Initial Q (Q _b , veh)	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		No	No		No	No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	141	588	5	5	1003	10	5	0	5	7	0	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	462	2851	24	651	2567	1145	56	13	27	181	0	181
Arrive On Green	0.04	0.79	0.79	0.72	0.72	0.11	0.00	0.11	0.11	0.00	0.11	0.11
Sat Flow, veh/h	1781	3611	31	824	3554	1585	123	115	238	1411	0	1585
Grp Volume(v), veh/h	141	289	304	5	1003	10	10	0	0	7	0	152
Grp Sat Flow(s), veh/h/ln	1781	1777	1865	824	1777	1585	476	0	0	1411	0	1585
Q Serve(g_s), s	2.5	5.3	5.3	0.2	14.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.5	5.3	5.3	0.2	14.2	0.2	12.3	0.0	0.0	0.8	0.0	12.2
Prop In Lane	1.00		0.02	1.00		1.00	0.50		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	462	1403	1473	651	2567	1145	96	0	0	181	0	181
V/C Ratio(X)	0.31	0.21	0.21	0.01	0.39	0.01	0.10	0.00	0.00	0.04	0.00	0.84
Avail Cap(c_a), veh/h	616	1403	1473	651	2567	1145	226	0	0	313	0	329
HCM Platoated Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.80	0.80	0.80	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.9	3.4	3.4	5.0	7.0	5.0	51.7	0.0	0.0	51.3	0.0	56.4
Incr Delay (d2), s/veh	0.4	0.3	0.3	0.0	0.4	0.0	0.5	0.0	0.0	0.1	0.0	9.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	0.8	1.8	1.8	0.0	5.1	0.1	0.3	0.0	0.0	0.2	0.0	5.4
Unsig. Movement Delay, s/veh												
LnGp Delay(d), s/veh	5.3	3.8	3.8	5.1	7.3	5.1	52.2	0.0	0.0	51.4	0.0	66.3
LnGp LOS	A	A	A	A	A	A	D	A	A	D	A	E
Approach Vol, veh/h	734					1018			10			159
Approach Delay, s/veh	4.1					7.3			52.2			65.6
Approach LOS	A					A			D			E
Timer - Assigned Phs	2		4			6	7	8				
Ph Duration (G+Y+Rc), s	20.8		109.2			20.8	8.8	100.4				
Change Period (Y+Rc), s	6.0		6.5			6.0	4.0	6.5				
Max Green Setting (Gmax), s	27.0		90.5			27.0	16.0	70.5				
Max Q Clear Time (g_c+11), s	14.3		7.3			14.2	4.5	16.2				
Green Ext Time (p_c), s	0.0		4.1			0.7	0.3	9.6				

Intersection Summary

HCM 6th Ctrl Delay 11.1
HCM 6th LOS B

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11: Scottsdale Rd & Lincoln Dr
Timings

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑↓	↑	↑↓	↑	↑↓	↑
Traffic Volume (vph)	575	47	389	43	56	355	1715	63	1627	426
Future Volume (vph)	575	47	389	43	56	355	1715	63	1627	426
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases										6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.5	5.0	5.0	4.5	20.0	4.5	20.0	8.0
Minimum Split (s)	40.0	40.0	9.0	40.0	40.0	9.0	28.0	9.0	28.0	40.0
Total Split (s)	27.0	27.0	25.0	21.0	21.0	25.0	57.0	15.0	47.0	27.0
Total Split (%)	22.5%	22.5%	20.8%	17.5%	17.5%	20.8%	47.5%	12.5%	39.2%	22.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
Act Effct Green (s)	29.9	29.9	50.3	7.7	7.7	17.4	52.2	7.9	41.0	76.9
Actuated g/C Ratio	0.25	0.25	0.42	0.06	0.06	0.14	0.44	0.07	0.34	0.64
v/c Ratio	0.81	0.80	0.56	0.42	0.47	0.78	0.86	0.59	1.02	0.41
Control Delay	59.6	59.2	12.6	64.1	32.6	60.3	36.0	89.5	59.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	59.2	12.6	64.1	32.6	60.3	36.0	89.5	59.0	4.1
LOS	E	E	B	E	C	E	D	F	E	A
Approach Delay	41.4			41.1		40.1		48.8		
Approach LOS	D			D		D		D		
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 75 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.02										
Intersection Signal Delay: 43.8										
Intersection LOS: D										
Intersection Capacity Utilization 79.6%										
ICU Level of Service D										
Analysis Period (min) 15										
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr										
										

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11: Scottsdale Rd & Lincoln Dr
HCM Signaled Intersection Capacity Analysis

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	575	47	389	43	56	61	355	1715	37	63	1627	426
Future Volume (vph)	575	47	389	43	56	61	355	1715	37	63	1627	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.97	0.91	1.00	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.92	1.00	1.00	1.00	1.00	1.00	0.85	1.00
Flt Protected	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satl. Flow (prot)	1681	1698	1583	1770	3263		3433	5069		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satl. Flow (perm)	1681	1698	1583	1770	3263		3433	5069		1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	625	51	423	47	61	66	386	1864	40	68	1768	463
RTOR Reduction (vph)	0	0	99	0	62	0	0	2	0	0	0	124
Lane Group Flow (vph)	337	339	324	47	65	0	386	1902	0	68	1768	339
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov		
Protected Phases	8	8	5	4	4		5	2	1	6	8	
Permitted Phases												6
Actuated Green, G (s)	29.9	29.9	48.1	7.7	7.7		18.2	51.4	7.0	40.2	70.1	
Effective Green, g (s)	29.9	29.9	48.1	7.7	7.7		18.2	51.4	7.0	40.2	70.1	
Actuated g/C Ratio	0.25	0.25	0.40	0.06	0.06	0.15	0.43	0.06	0.15	0.43	0.06	0.34
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0	4.0	6.0	7.0	
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2	1.0	0.2	2.0	
Lane Grp Cap (vph)	418	423	634	113	209		520	2171	103	1703	1017	
v/s Ratio Prot	c0.20	0.20	0.08	c0.03	0.02		c0.11	c0.38	0.04	c0.35	0.08	
v/s Ratio Perm												0.13
v/c Ratio	0.81	0.80	0.51	0.42	0.31		0.74	0.88	0.66	1.04	0.33	
Uniform Delay, d1	42.3	42.3	27.1	54.0	53.6		48.7	31.4	55.3	39.9	12.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.40	0.91	0.84
Incremental Delay, d2	10.3	9.9	0.3	0.9	0.3		5.0	5.4	8.4	29.1	0.0	
Delay (s)	52.6	52.2	27.4	54.9	53.9		53.6	36.7	85.6	65.6	10.8	
Level of Service	D	D	C	D	D		D	D	F	E	B	
Approach Delay (s)	42.7						54.2		39.6		55.2	
Approach LOS							D		D		E	
Intersection Summary												
HCM 2000 Control Delay	46.7											
HCM 2000 Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	79.6%											
ICU Level of Service												
Analysis Period (min)	15											
c - Critical Lane Group												

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14: Street A (Access A) & Indian Bend Rd.
HCM 6th TWSC

Intersection							
Int Delay, s/veh	4.1						
Movement	EBT	EBC	WBL	WBT	NBL	NBR	
Lane Configurations	↑↓		↑↓	↑↓			
Traffic Vol, veh/h	127	65	90	162	62	89	
Future Vol, veh/h	127	65	90	162	62	89	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	0	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	138	71	98	176	67	97	
Major/Minor							
Major1	Major2	Minor1					
Conflicting Flow All	0	0	209	0	546	174	
Stage 1	-	-	-	-	174	-	
Stage 2	-	-	-	-	372	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1362	-	499	869	
Stage 1	-	-	-	-	856	-	
Stage 2	-	-	-	-	697	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	1362	-	459	869	
Mov Cap-2 Maneuver	-	-	-	-	459	-	
Stage 1	-	-	-	-	788	-	
Stage 2	-	-	-	-	697	-	
Approach							
EB	WB	NB					
HCM Control Delay, s	0	2.8	11.5				
HCM LOS			B				
Minor Lane/Major Mvmt							
NBLn1	NBLn2	EBT	EBC	WBL	WBT		
Capacity (veh/h)	459	869	-	-	1362	-	
HCM Lane V/C Ratio	0.147	0.111	-	-	0.072	-	
HCM Control Delay (s)	14.2	9.7	-	-	7.8	0	
HCM Lane LOS	B	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0.2	-	

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15: Scottsdale Rd & Street B (Access B)
HCM 6th TWSC

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBC	NBL	NBT	SBT	SBR	
Lane Configurations	↑		↑↑↑	↑↑↑			
Traffic Vol, veh/h	0	7	0	2413	1717	6	
Future Vol, veh/h	0	7	0	2413	1717	6	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	8	0	2623	1866	7	
Major/Minor							
Minor2	Major1					Major2	
Conflicting Flow All	-	937	-	0	-	0	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Critical Hdwy	-	7.14	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	3.92	-	-	-	-	
Pot Cap-1 Maneuver	0	228	0	-	-	-	
Stage 1	0	-	0	-	-	-	
Stage 2	0	-	0	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	228	-	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Approach							
EB	WB	NB					
HCM Control Delay, s	21.3		0				
HCM LOS	C						
Minor Lane/Major Mvmt							
NBT	EBLn1	SBT	SBR				
Capacity (veh/h)	-	228	-	-			
HCM Lane V/C Ratio	-	0.033	-	-			
HCM Control Delay (s)	-	21.3	-	-			
HCM Lane LOS	-	C	-	-			
HCM 95th %tile Q(veh)	-	0.1	-	-			

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16: Scottsdale Rd & Tuckey Ln
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑↑		Y	↑↑↑
Traffic Vol, veh/h	4	4	2336	5	8	2196
Future Vol, veh/h	4	4	2336	5	8	2196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	125	-	
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	2539	5	9	2387
Major/Minor						
Minor1		Major1		Major2		
Conflicting Flow All	3515	1272	0	0	2544	0
Stage 1	2542	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	13	136	-	-	66	-
Stage 1	25	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	11	136	-	-	66	-
Mov Cap-2 Maneuver	11	-	-	-	-	-
Stage 1	22	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, s	284.5	-	0	-	0.2	-
HCM LOS	F	-	-	-	-	-
Minor Lane/Major Mvmt						
NBT		NBR		WBLn1		
Capacity (veh/h)	-	-	20	66	-	
HCM Lane V/C Ratio	-	-	0.435	0.132	-	
HCM Control Delay (s)	-	-	284.5	67.7	-	
HCM Lane LOS	-	-	F	F	-	
HCM 95th %tile Q(veh)	-	-	1.2	0.4	-	

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Intersection											
Int Delay, s/veh	3.5										
Movement	EBL	EBT	EBC	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Y	↑	↓	Y	↑	↓	Y	↑	↓	Y	↑
Traffic Vol, veh/h	7	33	1	2	35	52	1	0	2	54	0
Future Vol, veh/h	7	33	1	2	35	52	1	0	2	54	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	-	-	-	-	-	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	36	1	2	38	57	1	0	2	59	0
Major/Minor											
Major1		Major2		Minor1		Minor2					
Conflicting Flow All	95	0	0	37	0	0	128	152	37	125	124
Stage 1	-	-	-	-	-	-	53	53	-	71	71
Stage 2	-	-	-	-	-	-	75	99	-	54	53
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018
Pot Cap-1 Maneuver	1499	-	-	1574	-	-	845	740	1035	849	766
Stage 1	-	-	-	-	-	-	960	851	-	939	836
Stage 2	-	-	-	-	-	-	934	813	-	958	851
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1499	-	-	1574	-	-	833	736	1035	843	761
Mov Cap-2 Maneuver	-	-	-	-	-	-	833	736	-	843	761
Stage 1	-	-	-	-	-	-	955	847	-	934	835
Stage 2	-	-	-	-	-	-	925	812	-	951	847
Approach											
EB		WB		NB		SB					
HCM Control Delay, s	1.3	-	-	0.2	-	-	8.8	-	-	9.5	-
HCM LOS	A	-	-	-	-	-	A	-	-	A	-
Minor Lane/Major Mvmt											
NBLn1		EBL		EBT		WBL		WBT		NBR	
Capacity (veh/h)	958	1499	-	-	1574	-	-	-	-	860	-
HCM Lane V/C Ratio	0.003	0.005	-	-	0.001	-	-	-	-	0.078	-
HCM Control Delay (s)	8.8	7.4	-	-	7.3	-	-	-	-	9.5	-
HCM Lane LOS	A	A	-	-	A	-	-	A	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0	-	0.3	-

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3: Indian Bend Rd. & Scottsdale Plaza Resort
HCM 6th Roundabout

Intersection				
Intersection Delay, s/veh	4.4			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	264	299	0	10
Demand Flow Rate, veh/h	269	305	0	10
Vehicles Circulating, veh/h	9	2	278	295
Vehicles Exiting, veh/h	296	276	0	12
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.3	4.5	0.0	3.6
Approach LOS	A	A	-	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	269	305	0	10
Cap Entry Lane, veh/h	1367	1377	1039	1021
Entry HV Adj Factor	0.981	0.981	1.000	1.000
Flow Entry, veh/h	264	299	0	10
Cap Entry, veh/h	1341	1351	1039	1021
V/C Ratio	0.197	0.221	0.000	0.010
Control Delay, s/veh	4.3	4.5	3.5	3.6
LOS	A	A	A	A
95th %tile Queue, veh	1	1	0	0

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4: Scottsdale Rd & Indian Bend Rd.

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	107	159	90	483	200	256	110	1368	509	214	1392
Future Volume (vph)	107	159	90	483	200	256	110	1368	509	214	1392
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases			4			8				2	
Detector Phase	7	4	4	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0
Minimum Split (s)	8.5	13.0	13.0	8.5	13.0	9.4	9.5	29.4	8.5	9.4	29.4
Total Split (s)	16.0	17.0	17.0	24.0	25.0	14.0	14.0	47.0	24.0	14.0	47.0
Total Split (%)	15.7%	16.7%	16.7%	23.5%	24.5%	13.7%	13.7%	46.1%	23.5%	13.7%	46.1%
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4
All-Red Time (s)	1.0	2.8	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	C-Max	None	None	C-Max						
Act Effct Green (s)	9.5	10.0	10.0	18.4	18.9	31.9	10.0	42.6	67.0	10.0	42.6
Actuated g/C Ratio	0.09	0.10	0.10	0.18	0.19	0.31	0.10	0.42	0.66	0.10	0.42
v/c Ratio	0.70	0.95	0.34	0.85	0.63	0.51	0.36	0.70	0.52	1.35	0.77
Control Delay	66.7	102.3	5.1	54.0	47.7	17.3	47.0	27.5	10.0	226.6	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	102.3	5.1	54.0	47.7	17.3	47.0	27.5	10.0	226.6	28.8
LOS	E	F	A	D	D	B	D	C	B	F	C
Approach Delay		67.0			42.7			24.1			53.5
Approach LOS	E			D			C			D	
Intersection Summary											
Cycle Length: 102											
Actuated Cycle Length: 102											
Offset: 0 (0%) Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.35											
Intersection Signal Delay: 40.7											
Intersection LOS: D											
ICU Level of Service D											
Analysis Period (min) 15											
Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.											

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4: Scottsdale Rd & Indian Bend Rd.
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBC	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑	↑↑↑	↑	↑↑↑		
Traffic Volume (veh/h)	107	159	90	483	200	256	110	1368	509	214	1392	110	
Future Volume (veh/h)	107	159	90	483	200	256	110	1368	509	214	1392	110	
Initial Q (Q _b), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A _{pbt})	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No												
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	116	173	98	525	217	278	120	1487	553	233	1513	120	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	144	183	155	591	407	724	825	2052	908	425	1939	154	
Arrive On Green	0.08	0.10	0.10	0.17	0.22	0.22	0.32	0.53	0.53	0.24	0.40	0.40	
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	3456	5106	1585	1781	4823	382	
Grp Volume(v), veh/h	116	173	98	525	217	278	120	1487	553	233	1068	565	
Grp Sat Flow(s), veh/h/in	1781	1870	1585	1728	1870	1585	1728	1702	1585	1781	1702	1802	
O Serve(g_s), s	6.5	9.4	6.1	15.1	10.5	2.6	2.5	22.6	0.0	11.7	27.9	27.9	
Cyc/Q Clear(g_c), s	6.5	9.4	6.1	15.1	10.5	2.6	2.5	22.6	0.0	11.7	27.9	27.9	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.21	
Lane Grp Cap(c), veh/h	144	183	155	591	407	724	825	2052	908	425	1368	724	
V/C Ratio(X)	0.81	0.94	0.63	0.89	0.53	0.38	0.15	0.72	0.61	0.55	0.78	0.78	
Avail Cap(c_a), veh/h	210	183	155	678	407	724	825	2052	908	425	1368	724	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	46.1	45.7	44.2	41.3	35.3	14.0	27.4	19.4	9.9	34.0	26.6	26.6	
Incr Delay (d2), s/veh	8.5	49.7	6.1	11.6	0.7	0.1	0.0	2.3	3.0	0.9	4.5	8.2	
Initial O Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOf(50%), veh/in	3.2	6.9	2.6	7.3	4.8	3.4	1.0	8.0	6.2	5.1	11.8	13.2	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d), s/veh	54.6	95.4	50.3	52.9	36.0	14.1	27.4	21.7	13.0	34.9	31.0	34.8	
LnGrp LOS	D	F	D	D	D	B	C	C	B	C	C	C	
Approach Vol, veh/h	387			1020				2160			1866		
Approach Delay, s/veh	71.8			38.8				19.8			32.6		
Approach LOS	E			D				B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+R _c), s	28.8	47.0	24.4	17.0	28.8	47.0	12.2	29.2					
Change Period (Y+R _c), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7					
Max Green Setting (Gmax), s	* 10	41.0	* 20	* 10	* 10	41.0	12.0	* 18					
Max Q Clear Time (g _{c+11}), s	13.7	24.6	17.1	11.4	4.5	29.9	8.5	12.5					
Green Ext Time (p _c), s	0.0	2.4	0.3	0.0	0.0	2.3	0.0	0.7					
Intersection Summary													
HCM 6th Ctrl Delay				31.5									
HCM 6th LOS				C									
Notes													
User approved pedestrian interval to be less than phase max green.													
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.													

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5: Scottsdale Rd & Joshua Tree Ln
HCM 6th TWSC

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↑	7	6	1949	
Traffic Vol, veh/h	4	10	1992	7	6	1949
Future Vol, veh/h	4	10	1992	7	6	1949
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	11	2165	8	7	2118
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	3030	1087	0	0	2173	0
Stage 1	2169	-	-	-	-	-
Stage 2	861	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	25	181	-	-	102	-
Stage 1	44	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver	23	181	-	-	102	-
Mov Cap-2 Maneuver	23	-	-	-	-	-
Stage 1	41	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	82.6	0	0.1			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	61	102	-	
HCM Lane V/C Ratio	-	-	0.249	0.064	-	
HCM Control Delay (s)	-	-	82.6	42.7	-	
HCM Lane LOS	-	-	F	E	-	
HCM 95th %tile Q(veh)	-	-	0.9	0.2	-	

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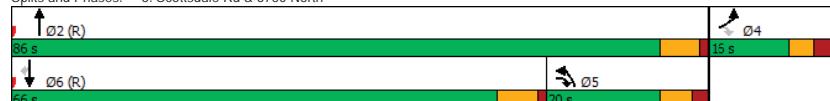
6: Scottsdale Rd & 6750 North
Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Traffic Volume (vph)	33	93	110	1932	1975	32
Future Volume (vph)	33	93	110	1932	1975	32
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases			4			6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	10.0	10.0	36.0	36.9	36.9
Total Split (s)	16.0	20.0	20.0	86.0	66.0	66.0
Total Split (%)	15.7%	19.6%	19.6%	84.3%	64.7%	64.7%
Yellow Time (s)	3.0	4.0	4.0	4.9	4.9	4.9
All-Red Time (s)	3.0	2.0	2.0	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	6.7	22.2	14.0	90.2	67.8	67.8
Actuated g/C Ratio	0.07	0.22	0.14	0.88	0.66	0.66
v/c Ratio	0.31	0.29	0.50	0.47	0.64	0.03
Control Delay	51.8	31.0	40.5	0.5	11.5	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	31.0	40.5	0.5	11.5	3.8
LOS	D	C	D	A	B	A
Approach Delay	36.5			2.6	11.4	
Approach LOS	D			A	B	

Intersection Summary

Cycle Length: 102
Actuated Cycle Length: 102
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 7.9
Intersection LOS: A
Intersection Capacity Utilization 63.4%
ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Scottsdale Rd & 6750 North



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Background 2023 Sat

6: Scottsdale Rd & 6750 North
HCM 6th Signalized Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	33	93	110	1932	1975	32
Future Volume (veh/h)	33	93	110	1932	1975	32
Initial Q (Q _b) veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	36	101	120	2100	2147	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	86	373	334	4260	3004	932
Arrive On Green	0.05	0.05	0.37	1.00	1.00	1.00
Sat Flow, veh/h	1781	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	36	101	120	2100	2147	35
Grp Sat Flow(s), veh/h/in	1781	1585	1781	1702	1702	1585
Q Serve(g_s), s	2.0	0.0	5.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.0	0.0	5.0	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	86	373	334	4260	3004	932
V/C Ratio(X)	0.42	0.27	0.36	0.49	0.71	0.04
Avail Cap(c_a), veh/h	175	452	334	4260	3004	932
HCM Platooning Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	31.9	27.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.1	0.7	0.4	1.5	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/in	0.9	2.9	2.0	0.2	0.4	0.0
Unsig. Movement Delay, s/veh						
LnGp Delay(d), s/veh	48.4	32.0	28.1	0.4	1.5	0.1
LnGp LOS	D	C	C	A	A	A
Approach Vol, veh/h	137			2220	2182	
Approach Delay, s/veh	36.3			1.9	1.5	
Approach LOS		D		A	A	
Timer - Assigned Phs		2	4	5	6	
Ph Duration (G+Y+R _c), s		91.1	10.9	25.1	66.0	
Change Period (Y+R _c), s		* 6	6.0	* 6	6.0	
Max Green Setting (Gmax), s		* 80	10.0	* 14	60.0	
Max Q Clear Time (g_c+11), s		2.0	4.0	7.0	2.0	
Green Ext Time (p_c), s		4.6	0.1	0.1	4.8	

Intersection Summary

HCM 6th Ctrl Delay 2.7
HCM 6th LOS A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Background 2023 Sat

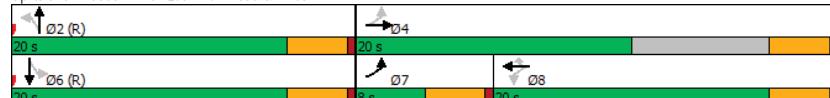
10: Quail Run Road & Lincoln Dr
Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	Ø2
Lane Configurations	↑	↑↑	↑↑	↑	↑	↑↑	
Traffic Volume (vph)	211	9	12	9	7	0	
Future Volume (vph)	211	9	12	9	7	0	
Turn Type	pm+pl	NA	NA	Perm	Perm	NA	
Protected Phases	7	4	8		6		2
Permitted Phases	4		8	6			
Detector Phase	7	4	8	8	6	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	
Total Split (%)	16.7%	41.7%	41.7%	41.7%	41.7%	42%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	24.0	24.0	16.0	16.0	16.0	16.0	
Actuated g/C Ratio	0.50	0.50	0.33	0.33	0.33	0.33	
v/c Ratio	0.37	0.01	0.01	0.02	0.02	0.16	
Control Delay	9.0	6.1	10.8	0.0	11.0	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.0	6.1	10.8	0.0	11.0	0.3	
LOS	A	A	B	A	B	A	
Approach Delay	8.9	6.1			0.7		
Approach LOS	A	A			A		

Intersection Summary

Cycle Length: 48
Actuated Cycle Length: 48
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Prelimed
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 5.2
Intersection LOS: A
Intersection Capacity Utilization 36.0%
ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 10: Quail Run Road & Lincoln Dr



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Background 2023 Sat

10: Quail Run Road & Lincoln Dr
HCM 6th Signalized Intersection Summary

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑		↑	↑↑	
Traffic Volume (veh/h)	211	9	0	0	12	9	0	0	0	7	0	178
Future Volume (veh/h)	211	9	0	0	12	9	0	0	0	7	0	178
Initial Q (Q _b) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00		1.00	1.00		1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No		No	No		No	No	No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	229	10	0	0	13	10	0	0	0	8	0	193
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	758	1777	0	150	1185	528	0	623	0	744	0	528
Arrive On Green	0.08	0.50	0.00	0.00	0.33	0.33	0.00	0.00	0.00	0.33	0.00	0.33
Sat Flow, veh/h	1781	3647	0	1405	3554	1585	0	1870	0	1781	0	1585
Grp Volume(v), veh/h	229	10	0	0	13	10	0	0	0	8	0	193
Grp Sat Flow(s), veh/h/ln	1781	1777	0	1405	1777	1585	0	1870	0	1781	0	1585
Q Serve(g_s), s	3.8	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.0	4.4
Cycle Q Clear(g_c), s	3.8	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.0	4.4
Prop In Lane	1.00			1.00			1.00	0.00		0.00	1.00	1.00
Lane Grp Cap(c), veh/h	758	1777	0	150	1185	528	0	623	0	744	0	528
V/C Ratio(X)	0.30	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.01	0.00	0.37
Avail Cap(c_a), veh/h	758	1777	0	150	1185	528	0	623	0	744	0	528
HCM Platooning Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.1	6.0	0.0	0.0	10.7	10.7	0.0	0.0	0.0	10.7	0.0	12.1
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGp Delay(d), s/veh	9.2	6.0	0.0	0.0	10.7	10.8	0.0	0.0	0.0	10.7	0.0	14.1
LnGp LOS	A	A	A	A	B	B	A	A	A	B	A	B
Approach Vol, veh/h	239				23				0	201		
Approach Delay, s/veh	9.0				10.8				0.0	14.0		
Approach LOS	A				B					B		
Timer - Assigned Phs	2				4				6			8
Ph Duration (G+Y+R _c), s	20.0				28.0				20.0			20.0
Change Period (Y+R _c), s	4.0				4.0				4.0			4.0
Max Green Setting (Gmax), s	16.0				16.0				16.0			16.0
Max Q Clear Time (g _c +11), s	0.0				2.1				6.4			2.2
Green Ext Time (p _c), s	0.0				0.0				0.8			0.0

Intersection Summary

HCM 6th Ctrl Delay 11.3
HCM 6th LOS B

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Background 2023 Sat

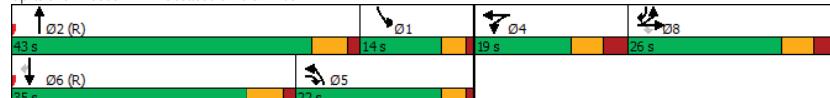
11: Scottsdale Rd & Lincoln Dr
Timings

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑↓	↑	↑↓	↑	↑↓	↑
Traffic Volume (vph)	455	58	329	42	36	253	1412	64	1579	427
Future Volume (vph)	455	58	329	42	36	253	1412	64	1579	427
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases										6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.5	5.0	5.0	4.5	20.0	4.5	20.0	8.0
Minimum Split (s)	40.0	40.0	9.0	40.0	40.0	9.0	28.0	9.0	28.0	40.0
Total Split (s)	26.0	26.0	22.0	19.0	19.0	22.0	43.0	14.0	35.0	26.0
Total Split (%)	25.5%	25.5%	21.6%	18.6%	18.6%	21.6%	42.2%	13.7%	34.3%	25.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
Act Effct Green (s)	21.7	21.7	39.2	7.2	7.2	14.5	43.4	7.4	34.6	62.3
Actuated g/C Ratio	0.21	0.21	0.38	0.07	0.07	0.14	0.43	0.07	0.34	0.61
v/c Ratio	0.78	0.78	0.49	0.37	0.39	0.57	0.74	0.55	1.00	0.41
Control Delay	53.7	53.5	7.8	52.7	21.6	44.9	28.9	55.4	64.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	53.5	7.8	52.7	21.6	44.9	28.9	55.4	64.4	12.4
LOS	D	D	A	D	C	D	C	E	E	B
Approach Delay										53.4
Approach LOS										

Intersection Summary

Cycle Length: 102
Actuated Cycle Length: 102
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 41.6
Intersection LOS: D
Intersection Capacity Utilization 72.7%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: Scottsdale Rd & Lincoln Dr



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11: Scottsdale Rd & Lincoln Dr
HCM Signaled Intersection Capacity Analysis

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↑	↑↓	↑	↑↓	↑	↑↓	↑	↑↓	↑
Traffic Volume (vph)	455	58	329	42	36	73	253	1412	56	64	1579	427
Future Volume (vph)	455	58	329	42	36	73	253	1412	56	64	1579	427
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	0.97	0.91	1.00	0.91	1.00	0.91
Frt	1.00	1.00	0.85	1.00	0.90	1.00	0.99	1.00	1.00	0.85		
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satl. Flow (prot)	1681	1704	1583	1770	3184		3433	5056		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satl. Flow (perm)	1681	1704	1583	1770	3184		3433	5056		1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	495	63	358	46	39	79	275	1535	61	70	1716	464
RTOR Reduction (vph)	0	0	124	0	73	0	0	3	0	0	0	191
Lane Group Flow (vph)	277	281	234	46	45	0	275	1593	0	70	1716	273
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	8	8	5	4	4		5	2		1	6	8
Permitted Phases												6
Actuated Green, G (s)	21.7	21.7	37.0	7.2	7.2		15.3	42.6		6.5	33.8	55.5
Effective Green, g (s)	21.7	21.7	37.0	7.2	7.2		15.3	42.6		6.5	33.8	55.5
Actuated g/C Ratio	0.21	0.21	0.36	0.07	0.07	0.15	0.42	0.06	0.33	0.54		
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2		1.0	0.2	2.0
Lane Grp Cap (vph)	357	362	574	124	224		514	2111		112	1685	969
v/s Ratio Prot	0.16	c0.16	0.06	c0.03	0.01		c0.08	c0.31		0.04	c0.34	0.06
v/s Ratio Perm												0.11
v/c Ratio	0.78	0.78	0.41	0.37	0.20		0.54	0.75		0.62	1.02	0.28
Uniform Delay, d1	37.9	37.9	24.3	45.2	44.7		40.1	25.3		46.6	34.1	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.94	1.38	6.48
Incremental Delay, d2	9.3	9.2	0.2	0.7	0.2		0.5	2.6		6.0	24.2	0.0
Delay (s)	47.1	47.0	24.5	45.9	44.8		40.6	27.8		50.0	71.3	81.2
Level of Service	D	D	C	D	D		D	C		D	E	F
Approach Delay (s)												72.6
Approach LOS												
Intersection Summary												
HCM 2000 Control Delay							50.3					D
HCM 2000 Volume to Capacity ratio							0.80					
Actuated Cycle Length (s)							102.0		Sum of lost time (s)		24.0	
Intersection Capacity Utilization							72.7%		ICU Level of Service		C	
Analysis Period (min)							15					
c - Critical Lane Group												

Palmerae
Background 2023 Sat

14: Street A (Access A) & Indian Bend Rd.
HCM 6th TWSC

Intersection						
Int Delay, s/veh						
Movement	EBT	EBC	WBL	WBT	NBL	NBR
Lane Configurations	↑	87	127	0	82	118
Traffic Vol, veh/h	0	87	127	0	82	118
Future Vol, veh/h	0	87	127	0	82	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	95	138	0	89	128
Major/Minor						
Major1		Major2		Minor1		
Conflicting Flow All	0	0	95	0	324	48
Stage 1	-	-	-	-	48	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1499	-	670	1021
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1499	-	608	1021
Mov Cap-2 Maneuver	-	-	-	-	608	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	771	-
Approach						
EB		WB		NB		
HCM Control Delay, s	0	7.6	-	10.2	-	-
HCM LOS	-	-	B	-	-	-
Minor Lane/Major Mvmt						
NBLn1		NBLn2		EBT		
Capacity (veh/h)	608	1021	-	-	1499	-
HCM Lane V/C Ratio	0.147	0.126	-	-	0.092	-
HCM Control Delay (s)	11.9	9	-	-	7.6	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0.3	-

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Palmerae
Background 2023 Sat

15: Scottsdale Rd & Street B (Access B)
HCM 6th TWSC

Intersection						
Int Delay, s/veh						
Movement	EBL	EBC	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑
Traffic Vol, veh/h	0	9	0	123	119	9
Future Vol, veh/h	0	9	0	123	119	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	0	134	129	10
Major/Minor						
Minor2		Major1		Major2		
Conflicting Flow All	-	70	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	830	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	830	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach						
EB		NB		SB		
HCM Control Delay, s	9.4	-	0	-	0	-
HCM LOS	A	-	-	-	-	-
Minor Lane/Major Mvmt						
NBT		EBLn1		SBT		
Capacity (veh/h)	-	830	-	-	-	-
HCM Lane V/C Ratio	-	0.012	-	-	-	-
HCM Control Delay (s)	-	9.4	-	-	-	-
HCM Lane LOS	-	A	-	-	-	-
HCM 95th %tile Q(veh)	-	0	-	-	-	-

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Palmerae
Background 2023 Sat

16: Scottsdale Rd & Tuckey Ln
HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y	↑↑↑			Y	↑↑↑
Traffic Vol, veh/h	8	8	2021	0	3	2073
Future Vol, veh/h	8	8	2021	0	3	2073
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	9	2197	0	3	2253
Major/Minor						
Minor1		Major1		Major2		
Conflicting Flow All	3104	1099	0	0	2197	0
Stage 1	2197	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	23	178	-	-	99	-
Stage 1	42	-	-	-	-	-
Stage 2	320	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	22	178	-	-	99	-
Mov Cap-2 Maneuver	22	-	-	-	-	-
Stage 1	41	-	-	-	-	-
Stage 2	320	-	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, s	157.2	-	0	-	0.1	-
HCM LOS	F	-	-	-	-	-
Minor Lane/Major Mvmt						
NBT		NBR		WBLn1		
Capacity (veh/h)	-	-	39	99	-	-
HCM Lane V/C Ratio	-	-	0.446	0.033	-	-
HCM Control Delay (s)	-	-	157.2	42.6	-	-
HCM Lane LOS	-	-	F	E	-	-
HCM 95th %tile Q(veh)	-	-	1.5	0.1	-	-

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Palmerae
Background 2023 Sat

Intersection											
Int Delay, s/veh	3.5										
Movement	EBL	EBT	EBC	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Y	↑	↑	2	4	54	82	1	0	3	73
Traffic Vol, veh/h	11	45		2	4	54	82	1	0	3	73
Future Vol, veh/h	11	45		2	4	54	82	1	0	3	73
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	-	-	-	-	-	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	49	2	4	59	89	1	0	3	79	0
Major/Minor											
Major1		Major2		Minor1		Minor2					
Conflicting Flow All	148	0	0	51	0	0	191	230	50	188	187
Stage 1	-	-	-	-	-	-	74	74	-	112	112
Stage 2	-	-	-	-	-	-	117	156	-	76	75
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018
Pot Cap-1 Maneuver	1434	-	-	1555	-	-	769	670	1018	772	708
Stage 1	-	-	-	-	-	-	935	833	-	893	803
Stage 2	-	-	-	-	-	-	888	769	-	933	833
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1434	-	-	1555	-	-	754	663	1018	763	700
Mov Cap-2 Maneuver	-	-	-	-	-	-	754	663	-	763	700
Stage 1	-	-	-	-	-	-	928	826	-	886	801
Stage 2	-	-	-	-	-	-	876	767	-	922	826
Approach											
EB		WB		NB		SB					
HCM Control Delay, s	1.4	-	-	0.2	-	-	8.9	-	10.2	-	-
HCM LOS	-	-	-	-	-	-	A	-	B	-	-
Minor Lane/Major Mvmt											
NBLn1		EBL		EBT		WBL		WBT		NBR	
Capacity (veh/h)	936	1434	-	-	1555	-	-	782	-	-	-
HCM Lane V/C Ratio	0.005	0.008	-	-	0.003	-	-	0.115	-	-	-
HCM Control Delay (s)	8.9	7.5	-	-	7.3	-	-	10.2	-	-	-
HCM Lane LOS	A	A	-	-	A	-	-	B	-	-	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.4	-	-	-

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HCM 6th Roundabout
3: Indian Bend Rd. & Scottsdale Plaza Resort

08/06/2020

Intersection	EB	WB	NB	SB
Intersection Delay, s/veh	5.8			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	195	515	175	8
Demand Flow Rate, veh/h	198	525	178	8
Vehicles Circulating, veh/h	327	14	189	534
Vehicles Exiting, veh/h	215	353	336	5
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.6	6.3	4.6	4.6
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	198	525	178	8
Cap Entry Lane, veh/h	989	1360	1138	800
Entry HV Adj Factor	0.982	0.981	0.983	1.000
Flow Entry, veh/h	195	515	175	8
Cap Entry, veh/h	971	1334	1119	800
V/C Ratio	0.200	0.386	0.156	0.010
Control Delay, s/veh	5.6	6.3	4.6	4.6
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	0

Timings
4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	113	150	582	234	148	181	1284	402	154	1664	114
Future Volume (vph)	113	150	582	234	148	181	1284	402	154	1664	114
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases											6
Detector Phase	7	4	3	8	1	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0	20.0
Minimum Split (s)	8.5	13.0	8.5	13.0	9.4	8.5	29.4	8.5	9.4	29.4	29.4
Total Split (s)	16.0	17.0	32.0	33.0	16.0	16.0	55.0	32.0	16.0	55.0	55.0
Total Split (%)	13.3%	14.2%	26.7%	27.5%	13.3%	13.3%	45.8%	26.7%	13.3%	45.8%	45.8%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4	4.4
All-Red Time (s)	1.0	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	C-Max	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	7.7	9.1	25.1	26.5	39.5	10.0	54.8	86.0	10.0	54.8	54.8
Actuated g/C Ratio	0.06	0.08	0.21	0.22	0.33	0.08	0.46	0.72	0.08	0.46	0.46
v/c Ratio	0.56	0.80	0.88	0.62	0.29	0.69	0.60	0.38	0.59	0.78	0.16
Control Delay	64.0	56.7	60.4	49.0	12.4	60.7	11.1	1.1	61.3	31.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	56.7	60.4	49.0	12.4	60.7	11.1	1.1	61.3	31.5	5.9
LOS	E	E	E	D	B	E	B	A	E	C	A
Approach Delay		59.1		50.3				13.8		32.4	
Approach LOS	E		D			B				C	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.88											
Intersection Signal Delay: 30.8											
Intersection LOS: C											
Intersection Capacity Utilization 78.4%											
ICU Level of Service D											
Analysis Period (min) 15											
Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.											

Palmerae 07/03/2015 Total 2023 AM - 6040 Split
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HCM 6th Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑↑↑	↑↑	↑↑↑↑	↑↑↑↑	↑↑
Traffic Volume (veh/h)	113	150	87	582	234	148	181	1284	402	154	1664	114
Future Volume (veh/h)	113	150	87	582	234	148	181	1284	402	154	1664	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No		No		No		No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	123	163	95	633	254	161	197	1396	437	167	1809	124
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	184	102	692	481	579	374	2085	964	374	2085	647
Arrive On Green	0.05	0.08	0.08	0.20	0.26	0.26	0.22	0.82	0.82	0.11	0.41	0.41
Sat Flow, veh/h	3456	2207	1221	3456	1870	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	123	130	128	633	254	161	197	1396	437	167	1809	124
Grp Sat Flow(s), veh/h/ln	1728	1777	1651	1728	1870	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	4.2	8.6	9.3	21.5	14.0	1.1	6.1	13.3	0.0	5.4	39.0	4.7
Cycle Q Clear(g_c), s	4.2	8.6	9.3	21.5	14.0	1.1	6.1	13.3	0.0	5.4	39.0	4.7
Prop In Lane	1.00		0.74	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	148	138	692	481	579	374	2085	964	374	2085	647
V/C Ratio(X)	0.70	0.87	0.93	0.92	0.53	0.28	0.53	0.67	0.45	0.45	0.87	0.19
Avail Cap(c_a), veh/h	346	148	138	806	481	579	374	2085	964	374	2085	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.0	54.4	54.7	47.0	38.3	14.5	44.3	7.7	3.1	50.1	32.5	13.6
Incr Delay (d2), s/veh	1.8	38.7	56.2	12.7	0.5	0.1	0.7	1.7	1.5	0.3	5.2	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	3.4	9.3	10.0	15.7	10.7	4.0	4.5	5.4	3.4	4.3	23.4	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.9	93.1	110.9	59.7	38.8	14.6	45.0	9.5	4.7	50.5	37.7	14.3
LnGrp LOS	E	F	F	E	D	B	D	A	A	D	D	B
Approach Vol, veh/h					1048			2030			2100	
Approach Delay, s/veh	87.7				47.7			11.9			37.4	
Approach LOS	F				D			B			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	55.0	31.0	17.0	17.0	55.0	10.1	37.9				
Change Period (Y+Rc), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7				
Max Green Setting (Gmax), s	* 12	49.0	* 28	* 10	* 12	49.0	12.0	* 26				
Max Q Clear Time (g_c+l1), s	7.4	15.3	23.5	11.3	8.1	41.0	6.2	16.0				
Green Ext Time (p_c), s	0.0	2.3	0.5	0.0	0.1	2.7	0.0	0.9				

Intersection Summary

HCM 6th Ctrl Delay 33.5

HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

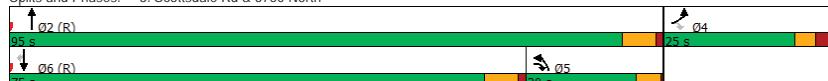
5: Scottsdale Rd & Joshua Tree Ln

08/06/2020

Intersection						
Int Delay, s/veh 0.1						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↑	↑↑↑	↑	↑↑↑	↑↑↑
Traffic Vol, veh/h	3	5	1840	4	1	2147
Future Vol, veh/h	3	5	1840	4	1	2147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	5	2000	4	1	2334
Major/Minor						
Conflicting Flow All		2938	1002	0	0	2004
Stage 1		2002	-	-	-	-
Stage 2		936	-	-	-	-
Critical Hdwy		5.74	7.14	-	-	5.34
Critical Hdwy Stg 1		6.64	-	-	-	-
Critical Hdwy Stg 2		6.04	-	-	-	-
Follow-up Hdwy		3.82	3.92	-	-	3.12
Pot Cap-1 Maneuver		28	207	-	-	124
Stage 1		57	-	-	-	-
Stage 2		309	-	-	-	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver		28	207	-	-	124
Mov Cap-2 Maneuver		28	-	-	-	-
Stage 1		57	-	-	-	-
Stage 2		307	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, s		73.6		0		
HCM LOS		F				
Minor Lane/Major Mvmt						
Capacity (veh/h)		-		61 124 -		
HCM Lane V/C Ratio		-		0.143 0.009 -		
HCM Control Delay (s)		-		73.6 34.3 -		
HCM Lane LOS		-		F D -		
HCM 95th %tile Q(veh)		-		0.5 0 -		

Timings
6: Scottsdale Rd & 6750 North

08/06/2020

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (vph)	75	68	144	1732	2194	111
Future Volume (vph)	75	68	144	1732	2194	111
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases						6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	8.0	8.0	36.0	36.9	36.9
Total Split (s)	25.0	20.0	20.0	95.0	75.0	75.0
Total Split (%)	20.8%	16.7%	16.7%	79.2%	62.5%	62.5%
Yellow Time (s)	3.0	3.5	3.5	4.9	4.9	4.9
All-Red Time (s)	3.0	0.5	0.5	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Act Effct Green (s)	7.3	27.1	16.0	104.1	82.9	82.9
Actuated g/C Ratio	0.06	0.23	0.13	0.87	0.69	0.69
v/c Ratio	0.39	0.12	0.34	0.43	0.68	0.11
Control Delay	59.3	32.5	65.6	4.1	16.8	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	32.5	65.6	4.1	16.8	7.9
LOS	E	C	E	A	B	A
Approach Delay	46.6			8.8	16.4	
Approach LOS	D			A	B	
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 95						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.68						
Intersection Signal Delay: 14.1						
Intersection LOS: B						
Intersection Capacity Utilization 64.0%						
ICU Level of Service B						
Analysis Period (min) 15						
Splits and Phases: 6: Scottsdale Rd & 6750 North						
						

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HCM 6th Signalized Intersection Summary
6: Scottsdale Rd & 6750 North

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	75	68	144	1732	2194	111
Future Volume (veh/h)	75	68	144	1732	2194	111
Initial Q (Q _b) veh	0	0	0	0	0	0
Ped-Bike Adj(A, pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	74	157	1883	2385	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	144	767	806	4383	2936	911
Arrive On Green	0.04	0.04	0.31	1.00	0.76	0.76
Sat Flow, veh/h	3456	2790	3456	5274	5274	1585
Grp Volume(v), veh/h	82	74	157	1883	2385	121
Grp Sat Flow(s), veh/h/in	1728	1395	1728	1702	1702	1585
Q Serve(g_s), s	2.8	0.0	4.0	0.0	34.8	2.4
Cycle Q Clear(g_c), s	2.8	0.0	4.0	0.0	34.8	2.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	144	767	806	4383	2936	911
V/C Ratio(X)	0.57	0.10	0.19	0.43	0.81	0.13
Avail Cap(c_a), veh/h	547	1093	806	4383	2936	911
HCM Platoons Ratio	1.00	1.00	1.33	1.33	1.33	1.33
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.4	32.4	33.1	0.0	10.1	6.3
Incr Delay (d2), s/veh	1.3	0.0	0.1	0.3	2.6	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/in	2.2	2.2	3.0	0.2	14.0	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	57.8	32.4	33.2	0.3	12.7	6.6
LnGrp LOS	E	C	C	A	B	A
Approach Vol, veh/h	156				2040	2506
Approach Delay, s/veh	45.7				2.8	12.4
Approach LOS	D				A	B
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+Rc), s	109.0		11.0	34.0	75.0	
Change Period (Y+Rc), s	* 6		6.0	* 6	* 6	
Max Green Setting (Gmax), s	* 89		19.0	* 16	* 69	
Max Q Clear Time (g_c+H1), s	2.0		4.8	6.0	36.8	
Green Ext Time (p_c), s	3.9		0.2	0.3	5.7	
Intersection Summary						
HCM 6th Ctrl Delay					9.3	
HCM 6th LOS					A	
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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Timings
10: Quail Run Road & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT					
Lane Configurations	↑	↑↓	↑	↑↓	↑	↓	↑	↑	↑↓					
Traffic Volume (vph)	258	1080	5	1178	6	5	0	8	0					
Future Volume (vph)	258	1080	5	1178	6	5	0	8	0					
Turn Type	pmt+pl	NA	Perm	NA	Perm	Perm	NA	Perm	NA					
Protected Phases	7	4	8		2		2	6						
Permitted Phases	4		8	8	2	2	2	6	6					
Detector Phase	7	4	8	8	2	2	6	6						
Switch Phase														
Minimum Initial (s)	4.0	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0					
Minimum Split (s)	8.0	28.0	28.0	28.0	28.0	33.0	33.0	33.0	33.0					
Total Split (s)	20.0	97.0	77.0	77.0	77.0	33.0	33.0	33.0	33.0					
Total Split (%)	15.4%	74.6%	59.2%	59.2%	59.2%	25.4%	25.4%	25.4%	25.4%					
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5					
All-Red Time (s)	1.0	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5					
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0					
Lead/Lag	Lead	Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes									
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None					
Act Effct Green (s)	112.8	110.3	92.3	92.3	92.3	7.2	7.2	7.2						
Actuated g/C Ratio	0.87	0.85	0.71	0.71	0.71	0.06	0.06	0.06						
v/c Ratio	0.65	0.39	0.02	0.51	0.01	0.10	0.12	0.50						
Control Delay	11.6	2.7	7.6	10.1	0.0	2.0	61.5	5.9						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	11.6	2.7	7.6	10.1	0.0	2.0	61.5	5.9						
LOS	B	A	A	B	A	A	E	A						
Approach Delay		4.4		10.1		2.0		8.9						
Approach LOS		A		B		A		A						
Intersection Summary														
Cycle Length: 130														
Actuated Cycle Length: 130														
Offset: 107 (82%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green														
Natural Cycle: 90														
Control Type: Actuated-Coordinated														
Maximum v/c Ratio: 0.65														
Intersection Signal Delay: 7.1					Intersection LOS: A									
Intersection Capacity Utilization 69.5%														
Analysis Period (min) 15														
Splits and Phases: 10: Quail Run Road & Lincoln Dr														

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HCM 6th Signalized Intersection Summary
10: Quail Run Road & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓	↑	↓	↑	↑	↑↓	↑	↑↓	
Traffic Volume (veh/h)	258	1080	5	5	1178	6	5	0	5	8	0	144
Future Volume (veh/h)	258	1080	5	5	1178	6	5	0	5	8	0	144
Initial Q (Q _b) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No	No		No	No		No	No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	1174	5	5	1280	7	5	0	5	9	0	157
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	390	2854	12	381	2464	1099	56	13	27	183	0	186
Arrive On Green	0.06	0.79	0.79	0.69	0.69	0.12	0.00	0.12	0.12	0.00	0.12	0.12
Sat Flow, veh/h	1781	3629	15	476	3554	1585	121	112	232	1411	0	1585
Grp Volume(v), veh/h	280	575	604	5	1280	7	10	0	0	9	0	157
Grp Sat Flow(s), veh/h/ln	1781	1777	1868	476	1777	1585	465	0	0	1411	0	1585
Q Serve(g_s), s	5.6	13.3	13.3	0.4	22.4	0.2	0.1	0.0	0.0	0.0	0.0	12.6
Cycle Q Clear(g_c), s	5.6	13.3	13.3	1.6	22.4	0.2	12.7	0.0	0.0	1.0	0.0	12.6
Prop In Lane	1.00		0.01	1.00		1.00	0.50		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	390	1397	1469	381	2464	1099	96	0	0	183	0	186
V/C Ratio(X)	0.72	0.41	0.41	0.01	0.52	0.01	0.10	0.00	0.00	0.05	0.00	0.84
Avail Cap(c_a), veh/h	498	1397	1469	381	2464	1099	221	0	0	311	0	329
HCM Platoton Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.76	0.76	1.00	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.7	4.4	4.4	6.6	9.6	6.1	51.4	0.0	0.0	51.1	0.0	56.2
Incr Delay (d2), s/veh	3.6	0.9	0.9	0.0	0.6	0.0	0.5	0.0	0.0	0.1	0.0	0.98
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/h	6.4	7.9	8.2	0.1	12.5	0.1	0.5	0.0	0.0	0.5	0.0	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.3	5.3	5.2	6.6	10.2	6.1	51.8	0.0	0.0	51.2	0.0	66.0
LnGrp LOS	B	A	A	A	B	A	D	A	A	D	A	E
Approach Vol, veh/h		1459				1292				10		166
Approach Delay, s/veh						10.1			51.8			65.2
Approach LOS							B		D		E	
Timer - Assigned Phs			2			4		6	7	8		
Phs Duration (G+Y+Rc), s			21.3			108.7		21.3	12.1	96.6		
Change Period (Y+Rc), s			6.0			6.5		6.0	4.0	6.5		
Max Green Setting (Gmax), s			27.0			90.5		27.0	16.0	70.5		
Max Q Clear Time (g_c+H1), s			14.7			15.3		14.6	7.6	24.4		
Green Ext Time (p_c), s			0.0			11.0		0.7	0.5	13.7		
Intersection Summary												
HCM 6th Ctrl Delay							11.8					
HCM 6th LOS							B					

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Timings
11: Scottsdale Rd & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	585	46	394	25	33	293	1374	37	1810	608
Future Volume (vph)	585	46	394	25	33	293	1374	37	1810	608
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases			8							6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	5.0	5.0	5.0	20.0	5.0	20.0	8.0	
Minimum Split (s)	40.0	40.0	9.0	40.0	40.0	9.0	28.0	9.0	28.0	40.0
Total Split (s)	26.0	26.0	19.0	19.0	19.0	61.0	14.0	56.0	26.0	
Total Split (%)	21.7%	21.7%	15.8%	15.8%	15.8%	50.8%	11.7%	46.7%	21.7%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	None	
Act Effct Green (s)	25.6	25.6	42.5	6.5	6.5	13.9	56.9	8.8	50.0	81.6
Actuated g/C Ratio	0.21	0.21	0.35	0.05	0.05	0.12	0.47	0.07	0.42	0.68
v/c Ratio	0.96	0.95	0.65	0.28	0.41	0.80	0.63	0.31	0.93	0.55
Control Delay	85.8	83.7	20.0	61.3	29.6	67.2	25.6	60.7	55.1	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.8	83.7	20.0	61.3	29.6	67.2	25.6	60.7	55.1	14.5
LOS	F	F	C	E	C	E	C	E	E	B
Approach Delay		59.9			36.7		32.8		45.2	
Approach LOS		E			D		C		D	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 90 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.96										
Intersection Signal Delay: 43.9										
Intersection LOS: D										
Intersection Capacity Utilization 81.6%										
ICU Level of Service D										
Analysis Period (min) 15										
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr										
	02 (R) 61 s	01 14 s	04 19 s	08 26 s						
	06 (R) 56 s	05 19 s								

Palmerae 07/03/2015 Total 2023 AM - 6040 Split
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HCM Signalized Intersection Capacity Analysis
11: Scottsdale Rd & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	585	46	394	25	33	53	293	1374	29	37	1810	608
Future Volume (vph)	585	46	394	25	33	53	293	1374	29	37	1810	608
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.97	0.91	1.00	0.91	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1697	1583	1770	3212		3433	5069		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1697	1583	1770	3212		3433	5069		1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	636	50	428	27	36	58	318	1493	32	40	1967	661
RTOR Reduction (vph)	0	0	100	0	55	0	0	2	0	0	0	148
Lane Group Flow (vph)	343	343	328	27	39	0	318	1523	0	40	1967	513
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	8	8	5	4	4		5	2		1	6	8
Permitted Phases			8									6
Actuated Green, G (s)	25.6	25.6	40.3	6.5	6.5		14.7	56.1		7.8	49.2	74.8
Effective Green, g (s)	25.6	25.6	40.3	6.5	6.5		14.7	56.1		7.8	49.2	74.8
Actuated g/C Ratio	0.21	0.21	0.34	0.05	0.05		0.12	0.47		0.06	0.41	0.62
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2		1.0	0.2	2.0
Lane Grp Cap (vph)	358	362	531	95	173		420	2369		115	2084	1079
v/s Ratio Prot	c0.20	0.20	0.08	c0.02	0.01		c0.09	0.30		0.02	c0.39	0.10
v/s Ratio Perm			0.13									0.22
v/c Ratio	0.96	0.95	0.62	0.28	0.23		0.76	0.64		0.35	0.94	0.48
Uniform Delay, d1	46.7	46.5	33.4	54.5	54.3		50.9	24.3		53.7	34.1	12.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.06	1.43	3.44
Incremental Delay, d2	36.0	33.3	1.5	0.6	0.2		6.8	1.4		0.6	8.9	0.1
Delay (s)	82.6	79.8	34.9	55.1	54.6		57.7	25.7		57.7	57.6	41.7
Level of Service	F	E	C	E	D		E	C		E	E	D
Approach Delay (s)		63.4			54.7			31.2			53.7	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay							48.4					
HCM 2000 Volume to Capacity ratio							0.87					
Actuated Cycle Length (s)							120.0					
Intersection Capacity Utilization							81.6%					
Analysis Period (min)							15					
c Critical Lane Group												

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HCM 6th TWSC
14: Palmerae Drive & Indian Bend Rd.

08/06/2020

Intersection							
Int Delay, s/veh	2						
Movement	EBT	EBC	WBL	WBT	NBL	NBR	
Lane Configurations	↑	↓	↑	↑	↑	↑	
Traffic Vol, veh/h	145	24	37	157	19	34	
Future Vol, veh/h	145	24	37	157	19	34	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	0	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	158	26	40	171	21	37	
Major/Minor							
Major1	Major2	Minor1					
Conflicting Flow All	0	0	184	0	422	171	
Stage 1	-	-	-	-	171	-	
Stage 2	-	-	-	-	251	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1391	-	588	873	
Stage 1	-	-	-	-	859	-	
Stage 2	-	-	-	-	791	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	1391	-	569	873	
Mov Cap-2 Maneuver	-	-	-	-	569	-	
Stage 1	-	-	-	-	859	-	
Stage 2	-	-	-	-	766	-	
Approach							
EB	WB	NB					
HCM Control Delay, s	0	1.5	10.1				
HCM LOS	B						
Minor Lane/Major Mvmt							
NBLn1	NBLn2	EBT	EBC	WBL	WBT		
Capacity (veh/h)	569	873	-	-	1391	-	
HCM Lane V/C Ratio	0.036	0.042	-	-	0.029	-	
HCM Control Delay (s)	11.6	9.3	-	-	7.7	0	
HCM Lane LOS	B	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-	

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HCM 6th TWSC
15: Scottsdale Rd & Street B (Access B)

08/06/2020

Intersection							
Int Delay, s/veh	0.3						
Movement	EBL	EBC	NBL	NBT	SBT	SBR	
Lane Configurations	↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	35	0	1867	1815	105	
Future Vol, veh/h	0	35	0	1867	1815	105	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	0	38	0	2029	1973	114	
Major/Minor							
Minor2	Major1					Major2	
Conflicting Flow All	-	1044	-	0	-	0	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Critical Hdwy	-	7.14	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	
Follow-up Hdwy	-	3.92	-	-	-	-	
Pot Cap-1 Maneuver	0	194	0	-	-	-	
Stage 1	0	-	0	-	-	-	
Stage 2	0	-	0	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	194	-	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	-	
Stage 1	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	
Approach							
EB	WB	NB					
HCM Control Delay, s	28	0	0				
HCM LOS	D						
Minor Lane/Major Mvmt							
NBT	EBLn1	SBT	SBR				
Capacity (veh/h)	-	194	-	-	-	-	
HCM Lane V/C Ratio	-	0.196	-	-	-	-	
HCM Control Delay (s)	-	28	-	-	-	-	
HCM Lane LOS	-	D	-	-	-	-	
HCM 95th %tile Q(veh)	-	0.7	-	-	-	-	

Palmerae 07/03/2015 Total 2023 AM - 6040 Split
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HCM 6th TWSC
16: Scottsdale Rd & Tuckey Ln

08/06/2020

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑↑		Y	↑↑↑
Traffic Vol, veh/h	3	10	1833	2	8	2099
Future Vol, veh/h	3	10	1833	2	8	2099
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	11	1992	2	9	2282
Major/Minor						
Minor1		Major1		Major2		
Conflicting Flow All	2924	997	0	0	1994	0
Stage 1	1993	-	-	-	-	-
Stage 2	931	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	29	208	-	-	126	-
Stage 1	57	-	-	-	-	-
Stage 2	311	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	27	208	-	-	126	-
Mov Cap-2 Maneuver	27	-	-	-	-	-
Stage 1	57	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, s	57.8	-	0	-	0.1	-
HCM LOS	F	-	-	-	-	-
Minor Lane/Major Mvmt						
NBT		NBR		WBLn1		
Capacity (veh/h)	-	-	82	126	-	-
HCM Lane V/C Ratio	-	-	0.172	0.069	-	-
HCM Control Delay (s)	-	-	57.8	35.7	-	-
HCM Lane LOS	-	-	F	E	-	-
HCM 95th %tile Q(veh)	-	-	0.6	0.2	-	-

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HCM 6th TWSC
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08/06/2020

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑		↑	
Traffic Vol, veh/h	342	1	0	474	0	8
Future Vol, veh/h	342	1	0	474	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	372	1	0	515	0	9
Major/Minor						
Major1		Major2		Minor1		
Conflicting Flow All	0	0	-	-	-	187
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.319
Pot Cap-1 Maneuver	-	-	0	-	0	824
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	824
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach						
EB		WB		NB		
HCM Control Delay, s	0	-	0	-	9.4	-
HCM LOS	A	-	-	-	-	-
Minor Lane/Major Mvmt						
NBLn1		EBT		WBT		
Capacity (veh/h)	824	-	-	-	-	-
HCM Lane V/C Ratio	0.011	-	-	-	-	-
HCM Control Delay (s)	9.4	-	-	-	-	-
HCM Lane LOS	A	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Palmeraie 07/03/2015 Total 2023 AM - 6040 Split
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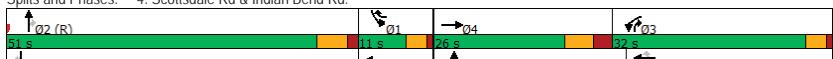
Intersection												
Int Delay, s/veh 10.7												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	3	9	2	6	15	19	1	154	2	12	299	1
Future Vol, veh/h	3	9	2	6	15	19	1	154	2	12	299	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	None	-	-	None	-	-	None	-
Storage Length	75	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	10	2	7	16	21	1	167	2	13	325	1
Major/Minor												
Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	37	0	0	12	0	0	221	68	11	143	59	27
Stage 1	-	-	-	-	-	-	17	17	-	41	41	-
Stage 2	-	-	-	-	-	-	204	51	-	102	18	-
Critical Hdwy	4.12	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318	-
Pot Cap-1 Maneuver	1574	-	-	1607	-	-	735	823	1070	826	832	1048
Stage 1	-	-	-	-	-	-	1002	881	-	974	861	-
Stage 2	-	-	-	-	-	-	798	852	-	904	880	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1574	-	-	1607	-	-	507	818	1070	691	827	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	507	818	-	691	827	-
Stage 1	-	-	-	-	-	-	1000	879	-	972	858	-
Stage 2	-	-	-	-	-	-	493	849	-	729	878	-
Approach	EB	WB	NB	SB								
HCM Control Delay, s	1.6	-	1.1	-	10.6	-	12.4	-	-	-	-	-
HCM LOS	-	-	B	-	B	-	-	-	-	-	-	-
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	817	1574	-	-	1607	-	-	821	-	-	-	-
HCM Lane V/C Ratio	0.209	0.002	-	-	0.004	-	-	0.413	-	-	-	-
HCM Control Delay (s)	10.6	7.3	-	-	7.2	-	-	12.4	-	-	-	-
HCM Lane LOS	B	A	-	-	A	-	-	B	-	-	-	-
HCM 95th %tile Q(veh)	0.8	0	-	-	0	-	-	2	-	-	-	-

Timings
4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	113	150	582	234	148	181	1284	402	154	1664	114
Future Volume (vph)	113	150	582	234	148	181	1284	402	154	1664	114
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	3	8	1	5	2	3	1	6	6
Permitted Phases	-	-	-	-	-	-	-	-	-	-	-
Detector Phase	7	4	3	8	1	5	2	3	1	6	6
Switch Phase	-	-	-	-	-	-	-	-	-	-	-
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0	20.0
Minimum Split (s)	8.5	13.0	8.5	13.0	9.4	8.5	29.4	8.5	9.4	29.4	29.4
Total Split (s)	28.0	26.0	32.0	30.0	11.0	11.0	51.0	32.0	11.0	51.0	51.0
Total Split (%)	23.3%	21.7%	26.7%	25.0%	9.2%	9.2%	42.5%	26.7%	9.2%	42.5%	42.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4	4.4
All-Red Time (s)	1.0	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	7.7	9.9	26.1	28.3	38.3	7.0	56.0	88.1	7.0	56.0	56.0
Actuated g/C Ratio	0.06	0.08	0.22	0.24	0.32	0.06	0.47	0.73	0.06	0.47	0.47
v/c Ratio	0.56	0.73	0.85	0.58	0.27	0.98	0.59	0.36	0.83	0.76	0.15
Control Delay	63.8	48.3	56.3	45.3	4.2	106.5	9.7	0.8	88.1	30.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.8	48.3	56.3	45.3	4.2	106.5	9.7	0.8	88.1	30.4	3.6
LOS	E	D	D	A	F	A	A	F	C	C	A
Approach Delay	-	53.3	-	45.6	-	-	17.2	-	-	33.4	-
Approach LOS	-	D	-	D	-	-	B	-	-	C	-
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.98											
Intersection Signal Delay: 31.1											
Intersection LOS: C											
Intersection Capacity Utilization 78.4%											
ICU Level of Service D											
Analysis Period (min) 15											

Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.



HCM 6th Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	113	150	87	582	234	148	181	1284	402	154	1664	114
Future Volume (veh/h)	113	150	87	582	234	148	181	1284	402	154	1664	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No											
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	123	163	95	633	254	161	197	1396	437	167	1809	124
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	212	117	692	504	632	446	1915	912	446	1915	594
Arrive On Green	0.05	0.10	0.10	0.20	0.27	0.27	0.26	0.75	0.75	0.13	0.38	0.38
Sat Flow, veh/h	3456	2207	1221	3456	1870	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	123	130	128	633	254	161	197	1396	437	167	1809	124
Grp Sat Flow(s), veh/h/ln	1728	1777	1651	1728	1870	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	4.2	8.5	9.2	21.5	13.8	1.1	5.7	18.1	0.0	5.3	41.2	5.0
Cycle Q Clear(g_c), s	4.2	8.5	9.2	21.5	13.8	1.1	5.7	18.1	0.0	5.3	41.2	5.0
Prop In Lane	1.00		0.74	1.00		1.00	1.00		1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	178	170	158	692	504	632	446	1915	912	446	1915	594
V/C Ratio(X)	0.69	0.76	0.81	0.92	0.50	0.25	0.44	0.73	0.48	0.37	0.94	0.21
Avail Cap(c_a), veh/h	691	281	261	806	504	632	446	1915	912	446	1915	594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.0	52.9	53.2	47.0	37.0	12.5	40.9	11.6	4.9	47.8	36.3	15.6
Incr Delay (d2), s/veh	1.8	2.6	3.8	12.7	0.3	0.1	0.3	2.5	1.8	0.2	11.1	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%), veh/ln	3.4	7.1	7.1	15.7	10.5	3.7	4.2	7.5	4.8	4.2	25.8	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.8	55.5	56.9	59.7	37.4	12.6	41.2	14.1	6.7	48.0	47.4	16.4
LnGrp LOS	E	E	E	E	D	B	D	B	A	D	D	B
Approach Vol, veh/h					381		1048		2030		2100	
Approach Delay, s/veh					56.7		47.1		15.1		45.6	
Approach LOS					E		D		B		D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.5	51.0	31.0	18.5	19.5	51.0	10.2	39.4				
Change Period (Y+Rc), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7				
Max Green Setting (Gmax), s	* 7	45.0	* 28	* 19	* 7	45.0	24.0	* 23				
Max Q Clear Time (g_c+l1), s	7.3	20.1	23.5	11.2	7.7	43.2	6.2	15.8				
Green Ext Time (p_c), s	0.0	2.3	0.5	0.3	0.0	1.0	0.1	0.8				
Intersection Summary												
HCM 6th Ctrl Delay					35.5							
HCM 6th LOS					D							
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Palmerae 07/03/2015 Total 2023 AM - 6040 Split Mitigated
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Timings

6: Scottsdale Rd & 6750 North

08/06/2020

Lane Group	EBL	EBC	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	75	68	144	1732	2194	111
Future Volume (vph)	75	68	144	1732	2194	111
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases						6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	8.0	8.0	36.0	36.9	36.9
Total Split (s)	27.0	18.0	18.0	93.0	75.0	75.0
Total Split (%)	22.5%	15.0%	15.0%	77.5%	62.5%	62.5%
Yellow Time (s)	3.0	3.5	3.5	4.9	4.9	4.9
All-Red Time (s)	3.0	0.5	0.5	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	
Act Effct Green (s)	7.3	25.1	14.0	104.1	84.9	84.9
Actuated g/C Ratio	0.06	0.21	0.12	0.87	0.71	0.71
v/c Ratio	0.39	0.13	0.39	0.43	0.66	0.11
Control Delay	59.3	34.0	64.7	3.5	13.6	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	34.0	64.7	3.5	13.6	6.6
LOS	E	C	E	A	B	A
Approach Delay	47.3			8.2	13.3	
Approach LOS	D			A	B	
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%) Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 95						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.66						
Intersection Signal Delay: 12.2						
Intersection LOS: B						
Intersection Capacity Utilization 64.0%						
Analysis Period (min) 15						
Splits and Phases: 6: Scottsdale Rd & 6750 North						

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HCM 6th Signalized Intersection Summary

6: Scottsdale Rd & 6750 North

08/06/2020

Movement	EBL	EBC	NBL	NBT	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	75	68	144	1732	2194	111
Future Volume (veh/h)	75	68	144	1732	2194	111
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	74	157	1883	2385	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	144	767	806	4382	2936	911
Arrive On Green	0.04	0.04	0.31	1.00	0.76	0.76
Sat Flow, veh/h	3456	2790	3456	5274	5274	1585
Grp Volume(v), veh/h	82	74	157	1883	2385	121
Grp Sat Flow(s), veh/h/in	1728	1395	1728	1702	1702	1585
Q Serve(g_s), s	2.8	0.0	4.0	0.0	34.8	2.4
Cycle Q Clear(g_c), s	2.8	0.0	4.0	0.0	34.8	2.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	144	767	806	4382	2936	911
V/C Ratio(X)	0.57	0.10	0.19	0.43	0.81	0.13
Avail Cap(c_a), veh/h	605	1139	806	4382	2936	911
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.33	
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	56.4	32.4	33.1	0.0	10.1	6.3
Incr Delay (d2), s/veh	1.3	0.0	0.1	0.3	2.6	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%), veh/in	2.2	2.2	3.0	0.2	14.0	1.6
Unsig. Movement Delay, s/veh						
LnGp Delay(d), s/veh	57.7	32.4	33.2	0.3	12.7	6.6
LnGp LOS	E	C	C	A	B	A
Approach Vol, veh/h	156		2040	2506		
Approach Delay, s/veh	45.7		2.8	12.4		
Approach LOS	D		A	B		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+Rc), s	109.0		11.0	34.0	75.0	
Change Period (Y+Rc), s	* 6		6.0	* 6	* 6	
Max Green Setting (Gmax), s	* 87		21.0	* 14	* 69	
Max Q Clear Time (g_c+l1), s	2.0		4.8	6.0	36.8	
Green Ext Time (p_c), s	3.9		0.2	0.3	5.7	
Intersection Summary						
HCM 6th Ctrl Delay			9.3			
HCM 6th LOS			A			
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Timings

11: Scottsdale Rd & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑↑	↑↑	↑↑	↑	↑↑↑	↑
Traffic Volume (vph)	585	46	394	25	33	293	1374	37	1810	608
Future Volume (vph)	585	46	394	25	33	293	1374	37	1810	608
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases										6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	5.0	5.0	5.0	20.0	5.0	20.0	8.0	
Minimum Split (s)	40.0	40.0	9.0	40.0	9.0	28.0	9.0	28.0	40.0	
Total Split (s)	31.0	31.0	15.0	19.0	19.0	15.0	56.0	14.0	55.0	31.0
Total Split (%)	25.8%	25.8%	12.5%	15.8%	15.8%	12.5%	46.7%	11.7%	45.8%	25.8%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	None	
Act Effct Green (s)	29.5	29.5	43.5	6.5	6.5	11.0	52.8	9.0	49.0	84.5
Actuated g/C Ratio	0.25	0.25	0.36	0.05	0.05	0.09	0.44	0.08	0.41	0.70
v/c Ratio	0.83	0.82	0.64	0.28	0.41	1.01	0.68	0.30	0.95	0.54
Control Delay	61.4	60.5	20.2	61.3	29.6	108.1	29.5	61.6	56.1	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	60.5	20.2	61.3	29.6	108.1	29.5	61.6	56.1	11.9
LOS	E	E	C	E	C	F	C	E	E	B
Approach Delay		45.3			36.7		43.1		45.2	
Approach LOS		D			D		D		D	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 90 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.01										
Intersection Signal Delay: 44.4										
Intersection LOS: D										
Intersection Capacity Utilization 81.6%										
ICU Level of Service D										
Analysis Period (min) 15										
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr										

HCM Signalized Intersection Capacity Analysis

11: Scottsdale Rd & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↓	↑	↓	↑	↑	↑	↑
Traffic Volume (vph)	585	46	394	25	33	53	293	1374	29	37	1810	608
Future Volume (vph)	585	46	394	25	33	53	293	1374	29	37	1810	608
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.97	0.91	1.00	0.91	1.00		
Frt	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	0.85		
Flt Protected	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00		
Satd. Flow (prot)	1681	1697	1583	1770	3212	3433	5069	1770	5085	1583		
Flt Permitted	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00		
Satd. Flow (perm)	1681	1697	1583	1770	3212	3433	5069	1770	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	636	50	428	27	36	58	318	1493	32	40	1967	661
RTOR Reduction (vph)	0	0	100	0	55	0	0	2	0	0	0	134
Lane Group Flow (vph)	343	343	328	27	39	0	318	1523	0	40	1967	527
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA	Prot	NA	pm+ov	
Protected Phases	8	8	5	4	4		5	2	1	6	8	
Permitted Phases			8								6	
Actuated Green, G (s)	29.5	29.5	41.3	6.5	6.5		11.8	52.0	8.0	48.2	77.7	
Effective Green, g (s)	29.5	29.5	41.3	6.5	6.5		11.8	52.0	8.0	48.2	77.7	
Actuated g/C Ratio	0.25	0.25	0.34	0.05	0.05		0.10	0.43	0.07	0.40	0.65	
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0	4.0	6.0	7.0	
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2	1.0	0.2	2.0	
Lane Grp Cap (vph)	413	417	544	95	173		337	2196	118	2042	1117	
v/s Ratio Prot	c0.20	0.20	0.06	c0.02	0.01		c0.09	0.30	0.02	c0.39	0.12	
v/s Ratio Perm			0.15								0.22	
v/c Ratio	0.83	0.82	0.60	0.28	0.23		0.94	0.69	0.34	0.96	0.47	
Uniform Delay, d1	42.9	42.8	32.6	54.5	54.3		53.8	27.5	53.5	35.0	10.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.09	1.37	3.18	
Incremental Delay, d2	12.7	11.8	1.3	0.6	0.2		34.0	1.8	0.5	11.5	0.1	
Delay (s)	55.6	54.6	33.8	55.1	54.6		87.8	29.4	58.6	59.3	34.3	
Level of Service	E	D	C	E	D		F	C	E	E	C	
Approach Delay (s)		46.9			54.7			39.5			53.1	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay	47.6											
HCM 2000 Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	81.6%											
Analysis Period (min)	15											

c = Critical Lane Group

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HCM 6th Roundabout

3: Indian Bend Rd. & Scottsdale Plaza Resort

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Intersection				
Intersection Delay, s/veh	7.4			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	256	674	303	8
Demand Flow Rate, veh/h	261	687	309	8
Vehicles Circulating, veh/h	400	22	245	689
Vehicles Exiting, veh/h	297	532	416	20
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.0	8.1	6.2	5.4
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	261	687	309	8
Cap Entry Lane, veh/h	918	1349	1075	683
Entry HV Adj Factor	0.982	0.981	0.981	1.000
Flow Entry, veh/h	256	674	303	8
Cap Entry, veh/h	901	1323	1054	683
V/C Ratio	0.284	0.509	0.288	0.012
Control Delay, s/veh	7.0	8.1	6.2	5.4
LOS	A	A	A	A
95th %tile Queue, veh	1	3	1	0

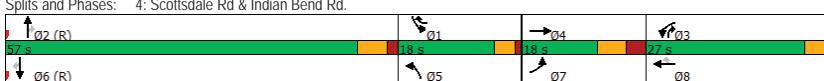
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Timings

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	240	269	451	302	132	286	1879	498	182	1625	185
Future Volume (vph)	240	269	451	302	132	286	1879	498	182	1625	185
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases											6
Detector Phase	7	4	3	8	1	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0	20.0
Minimum Split (s)	8.5	13.0	8.5	13.0	9.4	9.5	29.4	8.5	9.4	29.4	29.4
Total Split (s)	18.0	18.0	27.0	27.0	18.0	18.0	57.0	27.0	18.0	57.0	57.0
Total Split (%)	15.0%	15.0%	22.5%	22.5%	15.0%	15.0%	47.5%	22.5%	15.0%	47.5%	47.5%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4	4.4
All-Red Time (s)	1.0	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	C-Max	None	None	C-Max	C-Max	
Act Effct Green (s)	12.0	12.0	23.0	23.0	39.0	13.0	51.0	80.0	13.0	51.0	51.0
Actuated g/C Ratio	0.10	0.10	0.19	0.19	0.32	0.11	0.42	0.67	0.11	0.42	0.42
v/c Ratio	0.76	1.12	0.75	0.92	0.25	0.84	0.94	0.50	0.53	0.82	0.27
Control Delay	67.1	126.1	53.7	80.1	8.7	69.0	30.1	4.5	55.9	34.3	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	126.1	53.7	80.1	8.7	69.0	30.1	4.5	55.9	34.3	8.6
LOS	E	F	D	F	A	E	C	A	E	C	A
Approach Delay	103.7		56.0			29.5			33.9		
Approach LOS	F		E			C			C		
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.12											
Intersection Signal Delay: 42.3											
Intersection LOS: D											
Intersection Capacity Utilization 83.3%											
Analysis Period (min) 15											
Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.											
											

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HCM 6th Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	240	269	124	451	302	132	286	1879	498	182	1625	185
Future Volume (veh/h)	240	269	124	451	302	132	286	1879	498	182	1625	185
Initial Q (Q _b) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00			1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	261	292	135	490	328	143	311	2042	541	198	1766	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	316	218	98	548	344	489	431	2170	925	431	2170	674
Arrive On Green	0.09	0.09	0.09	0.16	0.18	0.25	0.85	0.85	0.12	0.43	0.43	
Sat Flow, veh/h	3456	2380	1074	3456	1870	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	261	216	211	490	328	143	311	2042	541	198	1766	201
Grp Sat Flow(v), veh/h/in	1728	1777	1677	1728	1870	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	8.9	11.0	11.0	16.7	20.8	1.5	9.9	36.0	0.0	6.4	36.5	7.0
Cycle Q Clear(g_c), s	8.9	11.0	11.0	16.7	20.8	1.5	9.9	36.0	0.0	6.4	36.5	7.0
Prop In Lane	1.00			1.00			1.00			1.00		
Lane Grp Cap(c), veh/h	316	163	154	548	344	489	431	2170	925	431	2170	674
V/C Ratio(X)	0.83	1.33	1.37	0.89	0.95	0.29	0.72	0.94	0.58	0.46	0.81	0.30
Avail Cap(c_a), veh/h	403	163	154	662	344	489	431	2170	925	431	2170	674
HCM Platoton Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.6	54.5	54.5	49.5	48.5	15.9	43.1	7.9	3.0	48.8	30.3	11.0
Incr Delay (d2), s/veh	8.5	183.2	202.9	11.6	36.3	0.1	5.1	9.7	2.7	0.3	3.5	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/in	4.2	13.2	13.3	8.1	13.1	2.1	4.1	5.2	2.4	2.8	15.3	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.1	237.7	257.4	61.1	84.7	16.0	48.2	17.6	5.7	49.0	33.8	12.1
LnGrp LOS	E	F	F	E	F	B	D	B	A	D	C	B
Approach Vol, veh/h									961			2894
Approach Delay, s/veh									62.5			33.2
Approach LOS									E			C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	57.0	26.0	18.0	19.0	57.0	15.0	29.1				
Change Period (Y+Rc), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7				
Max Green Setting (Gmax), s	* 14	51.0	* 23	* 11	* 14	51.0	14.0	* 20				
Max Q Clear Time (g_c+H1), s	8.4	38.0	18.7	13.0	11.9	38.5	10.9	22.8				
Green Ext Time (p_c), s	0.1	3.6	0.3	0.0	0.1	3.0	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay												
HCM 6th LOS												
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

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HCM 6th TWSC
5: Scottsdale Rd & Joshua Tree Ln

08/06/2020

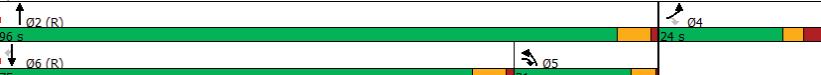
Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑↑		Y	↑↑↑
Traffic Vol, veh/h	5	5	2634	6	9	2270
Future Vol, veh/h	5	5	2634	6	9	2270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	150	-	
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	2863	7	10	2467
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	3874	1435	0	0	2870	0
Stage 1	2867	-	-	-	-	-
Stage 2	1007	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	8	105	-	-	44	-
Stage 1	15	-	-	-	-	-
Stage 2	283	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	6	105	-	-	44	-
Mov Cap-2 Maneuver	6	-	-	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, \$§	711.1	0	0.4			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	11	44	-	
HCM Lane v/C Ratio	-	-	0.988	0.222	-	
HCM Control Delay (s)	-	-	\$ 711.1	108.8	-	
HCM Lane LOS	-	-	F	F	-	
HCM 95th %tile Q(veh)	-	-	2	0.7	-	
Notes						
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon			

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Timings
6: Scottsdale Rd & 6750 North

08/06/2020

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y	Y	Y	↑↑↑	↑↑↑	Y
Traffic Volume (vph)	159	208	160	2476	2298	43
Future Volume (vph)	159	208	160	2476	2298	43
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases						6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	8.0	8.0	36.0	36.9	36.9
Total Split (s)	24.0	21.0	21.0	96.0	75.0	75.0
Total Split (%)	20.0%	17.5%	17.5%	80.0%	62.5%	62.5%
Yellow Time (s)	3.0	3.5	3.5	4.9	4.9	4.9
All-Red Time (s)	3.0	0.5	0.5	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Act Efect Green (s)	10.4	33.4	17.0	97.6	76.6	76.6
Actuated g/C Ratio	0.09	0.28	0.14	0.81	0.64	0.64
v/c Ratio	0.58	0.29	0.36	0.65	0.77	0.05
Control Delay	60.4	34.0	56.9	8.9	24.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	34.0	56.9	8.9	24.9	11.0
LOS	E	C	E	A	C	B
Approach Delay	45.5			11.8	24.6	
Approach LOS	D			B	C	
Intersection Summary						
Cycle Length:	120					
Actuated Cycle Length:	120					
Offset: 0 (0%)	Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 95						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.77						
Intersection Signal Delay: 19.7	Intersection LOS: B					
Intersection Capacity Utilization 66.8%	ICU Level of Service C					
Analysis Period (min) 15						
Splits and Phases: 6: Scottsdale Rd & 6750 North						
↑ 02 (R) 96 s						
↓ 06 (R) 75 s						
↑ 04 24 s						
↓ 05 21 s						

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HCM 6th Signalized Intersection Summary

6: Scottsdale Rd & 6750 North

08/06/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	159	208	160	2476	2298	43
Future Volume (veh/h)	159	208	160	2476	2298	43
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	226	174	2691	2498	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	245	767	705	4233	2936	911
Arrive On Green	0.07	0.07	0.27	1.00	0.57	0.57
Sat Flow, veh/h	3456	2790	3456	5274	5274	1585
Grp Volume(v), veh/h	173	226	174	2691	2498	47
Grp Sat Flow(s), veh/h/ln	1728	1395	1728	1702	1702	1585
Q Serve(g_s), s	5.9	0.0	4.7	0.0	48.8	1.6
Cycle Q Clear(g_c), s	5.9	0.0	4.7	0.0	48.8	1.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	245	767	705	4233	2936	911
V/C Ratio(X)	0.70	0.29	0.25	0.64	0.85	0.05
Avail Cap(c_a), veh/h	518	987	705	4233	2936	911
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	54.5	34.3	36.5	0.0	21.2	11.2
Incr Delay (d2), s/veh	1.4	0.1	0.2	0.7	3.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.6	3.8	2.0	0.3	19.3	0.6
Unsig. Movement Delay, s/veh						
LnGp Delay(d), s/veh	55.9	34.4	36.7	0.7	24.5	11.3
LnGp LOS	E	C	D	A	C	B
Approach Vol, veh/h	399		2865	2545		
Approach Delay, s/veh	43.7		2.9	24.3		
Approach LOS	D		A	C		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+Rc), s	105.5		14.5	30.5	75.0	
Change Period (Y+Rc), s	* 6		6.0	* 6	* 6	
Max Green Setting (Gmax), s	* 90		18.0	* 17	* 69	
Max Q Clear Time (g_c+l1), s	2.0		7.9	6.7	50.8	
Green Ext Time (p_c), s	7.6		0.6	0.4	5.7	
Intersection Summary						
HCM 6th Ctrl Delay			15.1			
HCM 6th LOS			B			
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Timings

10: Quail Run Road & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑	↔	↔	↑	↔
Traffic Volume (vph)	235	549	5	936	9	5	0	6	0
Future Volume (vph)	235	549	5	936	9	5	0	6	0
Turn Type	pmt+pl	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	7	4			8			2	6
Permitted Phases	4		8		8	2		6	6
Detector Phase	7	4	8	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	15.0	15.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	8.0	28.0	28.0	28.0	28.0	33.0	33.0	33.0	33.0
Total Split (s)	20.0	97.0	77.0	77.0	77.0	33.0	33.0	33.0	33.0
Total Split (%)	15.4%	74.6%	59.2%	59.2%	59.2%	25.4%	25.4%	25.4%	25.4%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	1.0	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Efect Green (s)	111.0	108.5	95.7	95.7	95.7	9.0	9.0	9.0	9.0
Actuated g/C Ratio	0.85	0.83	0.74	0.74	0.74	0.07	0.07	0.07	0.07
v/c Ratio	0.53	0.20	0.01	0.39	0.01	0.10	0.07	0.72	
Control Delay	5.9	2.5	6.2	7.4	0.0	2.1	55.8	17.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	2.5	6.2	7.4	0.0	2.1	55.8	17.4	
LOS	A	A	A	A	A	A	E	B	
Approach Delay			3.5		7.3		2.1		18.4
Approach LOS			A		A		A		B
Intersection Summary									
Cycle Length: 130									
Actuated Cycle Length: 130									
Offset: 0 (0%) Referenced to phase 4:EBTL and 8:WBTL, Start of Green									
Natural Cycle: 75									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.72									
Intersection Signal Delay: 7.2									
Intersection LOS: A									
Intersection Capacity Utilization 67.7%									
ICU Level of Service C									
Analysis Period (min) 15									
Splits and Phases: 10: Quail Run Road & Lincoln Dr									

HCM 6th Signalized Intersection Summary

10: Quail Run Road & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑	↑	↑	↓	↑↓	↓	↑	↑↓↑	↑
Traffic Volume (veh/h)	235	549	5	5	936	9	5	0	5	6	0	243
Future Volume (veh/h)	235	549	5	5	936	9	5	0	5	6	0	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	255	597	5	5	1017	10	5	0	5	7	0	264
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	435	2604	22	564	2211	986	54	13	26	238	0	290
Arrive On Green	0.07	0.72	0.72	0.62	0.62	0.18	0.00	0.18	0.18	0.00	0.18	
Sat Flow, veh/h	1781	3612	30	817	3554	1585	70	72	142	1411	0	1585
Grp Volume(v), veh/h	255	294	308	5	1017	10	10	0	0	7	0	264
Grp Sat Flow(s), veh/h/in	1781	1777	1865	817	1777	1585	285	0	0	1411	0	1585
Q Serve(g_s), s	6.4	7.2	7.2	0.3	19.7	0.3	0.1	0.0	0.0	0.0	0.0	21.2
Cycle Q Clear(g_c), s	6.4	7.2	7.2	0.3	19.7	0.3	21.4	0.0	0.0	0.8	0.0	21.2
Prop In Lane	1.00	0.02	0.00	1.00	1.00	0.50	0.0	0.50	1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	435	1281	1344	564	2211	986	94	0	0	238	0	290
V/C Ratio(X)	0.59	0.23	0.23	0.01	0.46	0.01	0.11	0.00	0.00	0.03	0.00	0.91
Avail Cap(c_a), veh/h	533	1281	1344	564	2211	986	126	0	0	273	0	329
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	0.80	0.80	0.80	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay(d), s/veh	10.0	6.1	6.1	9.3	13.0	9.3	45.1	0.0	0.0	43.7	0.0	52.1
Incr Delay (d2), s/veh	1.3	0.4	0.4	0.0	0.6	0.0	0.5	0.0	0.0	0.0	0.0	26.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/in	2.4	2.7	2.8	0.1	7.8	0.1	0.3	0.0	0.0	0.2	0.0	10.6
Unsig. Movement Delay, s/veh												
LnGp Delay(d), s/veh	11.2	6.5	6.5	9.4	13.6	9.4	45.6	0.0	0.0	43.8	0.0	78.4
LnGp LOS	B	A	A	A	B	A	D	A	A	D	A	E
Approach Vol, veh/h	857				1032			10				271
Approach Delay, s/veh	7.9				13.5			45.6				77.5
Approach LOS	A				B			D				E
Timer - Assigned Phs	2		4		6		7		8			
Phs Duration (G+Y+Rc), s	29.8		100.2		29.8		12.8		87.4			
Change Period (Y+Rc), s	6.0		6.5		6.0		4.0		6.5			
Max Green Setting (Gmax), s	27.0		90.5		27.0		16.0		70.5			
Max Q Clear Time (g_c+l1), s	23.4		9.2		23.2		8.4		21.7			
Green Ext Time (p_c), s	0.0		4.2		0.6		0.4		9.7			
Intersection Summary												
HCM 6th Ctrl Delay			19.4									
HCM 6th LOS			B									

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Timings

11: Scottsdale Rd & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	583	47	389	43	56	355	1959	74	1862	439		
Future Volume (vph)	583	47	389	43	56	355	1959	74	1862	439		
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov		
Protected Phases	8	8		5	4	4	5	2	1	6	8	
Permitted Phases												6
Detector Phase	8	8		5	4	4	5	2	1	6	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		4.5	5.0	5.0	4.5	20.0	4.5	20.0	8.0	
Minimum Split (s)	40.0	40.0		9.0	40.0	9.0	28.0	9.0	28.0	40.0		
Total Split (s)	27.0	27.0		25.0	21.0	21.0	25.0	57.0	15.0	47.0	27.0	
Total Split (%)	22.5%	22.5%		20.8%	17.5%	17.5%	20.8%	47.5%	12.5%	39.2%	22.5%	
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0	
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	
Lead/Lag								Lag		Lag		
Lead-Lag Optimize?								Yes		Yes		
Recall Mode	None	None		None	None	None	None	C-Max	None	C-Max	None	
Act Effct Green (s)	29.4	29.4		50.3	7.7	7.7	17.9	52.2	8.4	41.0	76.4	
Actuated g/C Ratio	0.24	0.24		0.42	0.06	0.06	0.15	0.44	0.07	0.34	0.64	
v/c Ratio	0.83	0.83		0.56	0.42	0.50	0.75	0.98	0.65	1.17	0.43	
Control Delay	62.6	61.9		12.6	64.1	30.7	58.4	49.3	90.3	113.2	3.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	62.6	61.9		12.6	64.1	30.7	58.4	49.3	90.3	113.2	3.7	
LOS	E	E		B	E	C	E	D	F	F	A	
Approach Delay					43.3			39.0		50.7		92.2
Approach LOS					D			D		D		F
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 75 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.17												
Intersection Signal Delay: 65.8												
Intersection LOS: E												
ICU Level of Service E												
Analysis Period (min) 15												
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr												

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HCM Signalized Intersection Capacity Analysis

11: Scottsdale Rd & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↓	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	583	47	389	43	56	74	355	1959	37	74	1862	439
Future Volume (vph)	583	47	389	43	56	74	355	1959	37	74	1862	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1697	1583	1770	3238		3433	5071		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1697	1583	1770	3238		3433	5071		1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92		0.92	0.92		0.92	0.92	0.92
Adj. Flow (vph)	634	51	423	47	61	80	386	2129	40	80	2024	477
RTOR Reduction (vph)	0	0	99	0	75	0	0	2	0	0	0	125
Lane Group Flow (vph)	342	343	324	47	66	0	386	2167	0	80	2024	352
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	8	8	5	4	4		5	2		1	6	8
Permitted Phases			8									6
Actuated Green, G (s)	29.4	29.4	48.1	7.7	7.7		18.7	51.4		7.5	40.2	69.6
Effective Green, g (s)	29.4	29.4	48.1	7.7	7.7		18.7	51.4		7.5	40.2	69.6
Actuated g/C Ratio	0.24	0.24	0.40	0.06	0.06		0.16	0.43		0.06	0.34	0.58
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2		1.0	0.2	2.0
Lane Grp Cap (vph)	411	415	634	113	207		534	2172		110	1703	1010
v/s Ratio Prot	c0.20	0.20	0.08	c0.03	0.02		c0.11	c0.43		0.05	c0.40	0.09
v/s Ratio Perm			0.12									0.14
v/c Ratio	0.83	0.83	0.51	0.42	0.32		0.72	1.00		0.73	1.19	0.35
Uniform Delay, d1	43.0	42.9	27.1	54.0	53.6		48.2	34.2		55.2	39.9	13.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.38	0.93	0.67
Incremental Delay, d2	12.9	12.1	0.3	0.9	0.3		4.1	18.8		12.7	89.1	0.1
Delay (s)	55.8	55.0	27.4	54.9	54.0		52.3	53.1		88.7	126.0	9.0
Level of Service	E	D	C	D	D		D	D		F	F	A
Approach Delay (s)		44.7			54.2			52.9			103.2	
Approach LOS		D			D			D			F	
Intersection Summary												
HCM 2000 Control Delay	71.7											
HCM 2000 Level of Service												
HCM 2000 Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	120.0											
Sum of lost time (s)								24.0				
Intersection Capacity Utilization	87.7%											
ICU Level of Service												
Analysis Period (min)	15											
c Critical Lane Group												

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HCM 6th TWSC

14: Street A (Access A) & Indian Bend Rd.

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Movement	EBT	EBC	WBL	WBT	NBL	NBT	NBR
Intersection							
Int Delay, s/veh	4						
Lane Configurations	↑	↓	↑	↓	↑	↓	↑
Traffic Vol, veh/h	144	65	92	177	62	91	
Future Vol, veh/h	144	65	92	177	62	91	
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	0	
Veh in Median Storage, #	0	-	-	0	0	0	-
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	157	71	100	192	67	99	
Major/Minor	Major1	Major2	Minor1				
Conflicting Flow All	0	0	228	0	585	193	
Stage 1	-	-	-	193	-	-	
Stage 2	-	-	-	392	-	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1340	-	473	849	
Stage 1	-	-	-	840	-	-	
Stage 2	-	-	-	683	-	-	
Platoon blocked, %	-	-	-	-	-	-	
Mov Cap-1 Maneuver	-	-	1340	-	433	849	
Mov Cap-2 Maneuver	-	-	-	-	433	-	
Stage 1	-	-	-	840	-	-	
Stage 2	-	-	-	626	-	-	
Approach	EB	WB	NB				
HCM Control Delay, s	0	2.7	11.8				
HCM LOS			B				
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBC	WBL	WBT	
Capacity (veh/h)	433	849	-	-	1340	-	
HCM Lane V/C Ratio	0.156	0.117	-	-	0.075	-	
HCM Control Delay (s)	14.8	9.8	-	-	7.9	0	
HCM Lane LOS	B	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0.2	-	

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HCM 6th TWSC
15: Scottsdale Rd & Street B (Access B)

08/06/2020

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBC	NBL	NBT	SBT	SBR
Lane Configurations		↑	↑↑↑	↑↑↑		
Traffic Vol, veh/h	0	112	0	2664	1781	127
Future Vol, veh/h	0	112	0	2664	1781	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	122	0	2896	1936	138
Major/Minor						
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	1037	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	196	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	196	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach						
Approach	EB	NB	SB			
HCM Control Delay, s	49.5	0	0			
HCM LOS	E					
Minor Lane/Major Mvmt						
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	196	-	-		
HCM Lane V/C Ratio	-	0.621	-	-		
HCM Control Delay (s)	-	49.5	-	-		
HCM Lane LOS	-	E	-	-		
HCM 95th %tile Q(veh)	-	3.6	-	-		

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HCM 6th TWSC
16: Scottsdale Rd & Tuckey Ln

08/06/2020

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↑	↑↑↑		↑	↑↑↑
Traffic Vol, veh/h	4	4	2601	5	8	2456
Future Vol, veh/h	4	4	2601	5	8	2456
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	2827	5	9	2670
Major/Minor						
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	3916	1416	0	0	2832	0
Stage 1	2830	-	-	-	-	-
Stage 2	1086	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	8	109	-	-	46	-
Stage 1	16	-	-	-	-	-
Stage 2	257	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	6	109	-	-	46	-
Mov Cap-2 Maneuver	6	-	-	-	-	-
Stage 1	16	-	-	-	-	-
Stage 2	207	-	-	-	-	-
Approach						
Approach	WB	NB	SB			
HCM Control Delay, \$s	629.6	0	0.3			
HCM LOS	F					
Minor Lane/Major Mvmt						
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	11	46	-	-
HCM Lane V/C Ratio	-	-	0.791	0.189	-	-
HCM Control Delay (s)	-	-	\$ 629.6	100.7	-	-
HCM Lane LOS	-	-	F	F	-	-
HCM 95th %tile Q(veh)	-	-	1.7	0.6	-	-
Notes						
:- Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

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HCM 6th TWSC

21:

08/06/2020

Intersection

Int Delay, s/veh 0.2

Movement EBT EBR WBL WBT NBL NBR

Lane Configurations	↑↑	↑	↑	↑↑	↑	
Traffic Vol, veh/h	613	1	0	620	0	19
Future Vol, veh/h	613	1	0	620	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	666	1	0	674	0	21

Major/Minor Major1 Major2 Minor1

Conflicting Flow All 0 0 - - - 334

Stage 1 - - - - - -

Stage 2 - - - - - -

Critical Hdwy - - - - - 6.94

Critical Hdwy Stg 1 - - - - - -

Critical Hdwy Stg 2 - - - - - -

Follow-up Hdwy - - - - - 3.32

Pot Cap-1 Maneuver - - 0 - 0 662

Stage 1 - - 0 - 0 -

Stage 2 - - 0 - 0 -

Platoon blocked, % - - -

Mov Cap-1 Maneuver - - - - - 662

Mov Cap-2 Maneuver - - - - - -

Stage 1 - - - - - -

Stage 2 - - - - - -

Approach EB WB NB

HCM Control Delay, s 0 0 10.6

HCM LOS B

Minor Lane/Major Mvmt NBLn1 EBT EBR WBT

Capacity (veh/h) 662 - - -

HCM Lane V/C Ratio 0.031 - - -

HCM Control Delay (s) 10.6 - - -

HCM Lane LOS B - - -

HCM 95th %tile Q(veh) 0.1 - - -

HCM 6th TWSC

37: 6750 North & Street C

08/06/2020

Intersection

Int Delay, s/veh 14.3

Movement EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR

Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	7	33	1	2	35	52	1	273	2	54	363	8
Future Vol, veh/h	7	33	1	2	35	52	1	273	2	54	363	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None	-	-	None	-	None	-
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	36	1	2	38	57	1	297	2	59	395	9

Major/Minor Major1 Major2 Minor1 Minor2

Conflicting Flow All 95 0 0 37 0 0 326 152 37 273 124 67

Stage 1 - - - - - 53 53 - 71 71 -

Stage 2 - - - - - 273 99 - 202 53 -

Critical Hdwy 4.12 - - 4.12 - 7.12 6.52 6.22 7.12 6.52 6.22

Critical Hdwy Stg 1 - - - - - 6.12 5.52 - 6.12 5.52 -

Critical Hdwy Stg 2 - - - - - 6.12 5.52 - 6.12 5.52 -

Follow-up Hdwy 2.218 - - 2.218 - 3.518 4.018 3.318 3.518 4.018 3.318

Pot Cap-1 Maneuver 1499 - - 1574 - 627 740 1035 679 766 997

Stage 1 - - - - - 960 851 - 939 836 -

Stage 2 - - - - - 733 813 - 800 851 -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 1499 - - 1574 - 366 736 1035 462 761 997

Mov Cap-2 Maneuver - - - - - 366 736 - 462 761 -

Stage 1 - - - - - 955 847 - 934 835 -

Stage 2 - - - - - 383 812 - 516 847 -

Approach EB WB NB SB

HCM Control Delay, s 1.3 0.2 13.2 19.2

HCM LOS B C

Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBT WBR SBLn1

Capacity (veh/h) 735 1499 - - 1574 - - 706

HCM Lane V/C Ratio 0.408 0.005 - - 0.001 - - 0.654

HCM Control Delay (s) 13.2 7.4 - - 7.3 - - 19.2

HCM Lane LOS B A - - A - - C

HCM 95th %tile Q(veh) 2 0 - - 0 - - 4.9

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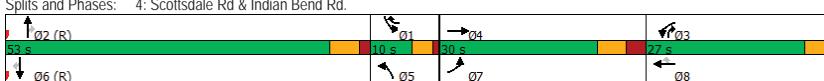
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Timings

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	240	269	451	302	132	286	1879	498	182	1625	185
Future Volume (vph)	240	269	451	302	132	286	1879	498	182	1625	185
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases					8			2			6
Detector Phase	7	4	3	8	1	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0	20.0
Minimum Split (s)	8.5	13.0	8.5	13.0	9.4	9.5	29.4	8.5	9.4	29.4	29.4
Total Split (s)	30.0	30.0	27.0	27.0	10.0	10.0	53.0	27.0	10.0	53.0	53.0
Total Split (%)	25.0%	25.0%	22.5%	22.5%	8.3%	8.3%	44.2%	22.5%	8.3%	44.2%	44.2%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4	4.4
All-Red Time (s)	1.0	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	C-Max	None	None	C-Max	C-Max	
Act Effct Green (s)	12.6	16.8	25.4	29.6	38.6	6.0	50.8	82.2	6.0	50.8	50.8
Actuated g/C Ratio	0.10	0.14	0.21	0.25	0.32	0.05	0.42	0.68	0.05	0.42	0.42
v/c Ratio	0.72	0.82	0.67	0.71	0.25	1.82	0.95	0.48	1.16	0.82	0.27
Control Delay	63.6	56.4	49.0	51.1	8.2	416.0	29.1	3.5	167.3	35.1	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	56.4	49.0	51.1	8.2	416.0	29.1	3.5	167.3	35.1	9.2
LOS	E	E	D	D	A	F	C	A	F	D	A
Approach Delay	59.1		43.7			65.9			44.7		
Approach LOS	E		D			E			D		
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.82											
Intersection Signal Delay: 55.2											
Intersection LOS: E											
Intersection Capacity Utilization 83.3%											
Analysis Period (min) 15											
Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.											
											

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HCM 6th Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	240	269	124	451	302	132	286	1879	498	182	1625	185
Future Volume (veh/h)	240	269	124	451	302	132	286	1879	498	182	1625	185
Initial Q (Q _b) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00			1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	261	292	135	490	328	143	311	2042	541	198	1766	201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	319	344	155	548	441	541	364	2000	872	364	2000	621
Arrive On Green	0.09	0.14	0.14	0.16	0.24	0.24	0.21	0.78	0.11	0.39	0.39	
Sat Flow, veh/h	3456	2380	1074	3456	1870	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	261	216	211	490	328	143	311	2042	541	198	1766	201
Grp Sat Flow(v), veh/h/ln	1728	1777	1677	1728	1870	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	8.9	14.2	14.8	16.7	19.5	1.5	10.4	47.0	0.0	6.5	38.6	7.5
Cycle Q Clear(g_c), s	8.9	14.2	14.8	16.7	19.5	1.5	10.4	47.0	0.0	6.5	38.6	7.5
Prop In Lane	1.00											
Lane Grp Cap(c), veh/h	319	257	242	548	441	541	364	2000	872	364	2000	621
V/C Ratio(X)	0.82	0.84	0.87	0.89	0.74	0.26	0.85	1.02	0.62	0.54	0.88	0.32
Avail Cap(c_a), veh/h	749	341	321	662	441	541	364	2000	872	364	2000	621
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.5	50.0	50.2	49.5	42.5	13.9	46.5	13.0	4.9	51.0	33.9	12.9
Incr Delay (d2), s/veh	2.0	10.6	14.6	11.6	5.9	0.1	17.0	25.6	3.3	1.0	6.1	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/hn	4.0	7.1	7.2	8.1	9.7	1.9	4.9	9.5	3.5	2.9	16.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	55.5	60.6	64.8	61.1	48.4	14.0	63.5	38.6	8.2	51.9	40.0	14.3
LnGrp LOS	E	E	E	E	D	B	E	F	A	D	D	
Approach Vol, veh/h												
Approach Delay, s/veh	688						961					2165
Approach LOS							60.0					38.7
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.6	53.0	26.0	24.3	16.6	53.0	15.1	35.3				
Change Period (Y+Rc), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7				
Max Green Setting (Gmax), s	* 6	47.0	* 23	* 23	* 6	47.0	26.0	* 20				
Max Q Clear Time (g_c+H1), s	8.5	49.0	18.7	16.8	12.4	40.6	10.9	21.5				
Green Ext Time (p_c), s	0.0	0.0	0.3	0.6	0.0	2.3	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay												
HCM 6th LOS												
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

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Timings
6: Scottsdale Rd & 6750 North

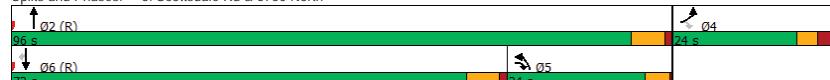
08/06/2020

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (vph)	159	208	160	2476	2298	43
Future Volume (vph)	159	208	160	2476	2298	43
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases		4			6	
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	8.0	8.0	36.0	36.9	36.9
Total Split (s)	24.0	24.0	24.0	96.0	72.0	72.0
Total Split (%)	20.0%	20.0%	20.0%	80.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.5	3.5	4.9	4.9	4.9
All-Red Time (s)	3.0	0.5	0.5	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	4.0	4.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	10.4	36.4	20.0	97.6	73.6	73.6
Actuated g/C Ratio	0.09	0.30	0.17	0.81	0.61	0.61
v/c Ratio	0.58	0.27	0.30	0.65	0.80	0.05
Control Delay	60.4	31.7	54.4	9.4	27.3	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	31.7	54.4	9.4	27.3	12.7
LOS	E	C	D	A	C	B
Approach Delay	44.2			12.1	27.0	
Approach LOS	D			B	C	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 20.8
Intersection LOS: C
Intersection Capacity Utilization 66.8%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 6: Scottsdale Rd & 6750 North



HCM 6th Signalized Intersection Summary
6: Scottsdale Rd & 6750 North

08/06/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	159	208	160	2476	2298	43
Future Volume (veh/h)	159	208	160	2476	2298	43
Initial Q (Q _b) veh	0	0	0	0	0	0
Ped-Bike Adj(A, pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	173	226	174	2691	2498	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	245	837	791	4233	2808	872
Arrive On Green	0.07	0.07	0.30	1.00	0.55	0.55
Sat Flow, veh/h	3456	2790	3456	5274	5274	1585
Grp Volume(v), veh/h	173	226	174	2691	2498	47
Grp Sat Flow(s), veh/h/ln	1728	1395	1728	1702	1702	1585
Q Serve(g_s), s	5.9	0.0	4.5	0.0	51.7	1.7
Cycle Q Clear(g_c), s	5.9	0.0	4.5	0.0	51.7	1.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	245	837	791	4233	2808	872
V/C Ratio(X)	0.70	0.27	0.22	0.64	0.89	0.05
Avail Cap(c_a), veh/h	518	1057	791	4233	2808	872
HCM Platoons Ratio	1.00	1.00	1.33	1.33	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.5	32.0	33.7	0.0	23.8	12.5
Incr Delay (d2), s/veh	1.4	0.1	0.1	0.7	4.7	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.6	3.8	1.9	0.3	21.0	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	55.9	32.1	33.9	0.7	28.5	12.6
LnGrp LOS	E	C	C	A	C	B
Approach Vol, veh/h	399			2865	2545	
Approach Delay, s/veh	42.4			2.8	28.2	
Approach LOS	D			A	C	
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+Rc), s	105.5		14.5	33.5	72.0	
Change Period (Y+Rc), s	* 6		6.0	* 6	* 6	
Max Green Setting (Gmax), s	* 90		18.0	* 20	* 66	
Max Q Clear Time (g_c+H1), s	2.0		7.9	6.5	53.7	
Green Ext Time (p_c), s	7.6		0.6	0.4	4.9	

Intersection Summary

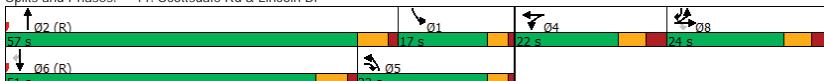
HCM 6th Ctrl Delay 16.6
HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Timings
11: Scottsdale Rd & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↑↓	↑↓	↑	↑↓↑	↑
Traffic Volume (vph)	583	47	389	43	56	355	1959	74	1862	439
Future Volume (vph)	583	47	389	43	56	355	1959	74	1862	439
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases			8							6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.5	5.0	5.0	4.5	20.0	4.5	20.0	8.0
Minimum Split (s)	40.0	40.0	9.0	40.0	40.0	9.0	28.0	9.0	28.0	40.0
Total Split (s)	24.0	24.0	23.0	22.0	22.0	23.0	57.0	17.0	51.0	24.0
Total Split (%)	20.0%	20.0%	19.2%	18.3%	18.3%	19.2%	47.5%	14.2%	42.5%	20.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	None	
Act Effct Green (s)	26.9	26.9	46.3	7.7	7.7	16.4	53.0	10.1	45.0	77.9
Actuated g/C Ratio	0.22	0.22	0.39	0.06	0.06	0.14	0.44	0.08	0.38	0.65
v/c Ratio	0.91	0.90	0.59	0.42	0.50	0.82	0.97	0.54	1.06	0.42
Control Delay	75.1	74.0	14.7	64.1	30.7	65.3	46.2	83.0	73.6	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	74.0	14.7	64.1	30.7	65.3	46.2	83.0	73.6	4.1
LOS	E	E	B	E	C	E	D	F	E	A
Approach Delay		51.7			39.0		49.0		61.1	
Approach LOS		D			D		D		E	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 75 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.06										
Intersection Signal Delay: 54.0										
Intersection LOS: D										
Intersection Capacity Utilization 87.7%										
ICU Level of Service E										
Analysis Period (min) 15										
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr										
										

Palmerae 07/03/2015 Total 2023 PM - 6040 Split Mitigated
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HCM Signalized Intersection Capacity Analysis
11: Scottsdale Rd & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑↓	↑↓	↑↑↓	↑↓	↑↑	↑	↑↑↓	↑
Traffic Volume (vph)	583	47	389	43	56	74	355	1959	37	74	1862	439
Future Volume (vph)	583	47	389	43	56	74	355	1959	37	74	1862	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	6.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	0.97	0.91	1.00	0.91	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.85	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1697	1583	1770	3238		3433	5071		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1697	1583	1770	3238		3433	5071		1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	634	51	423	47	61	80	386	2129	40	80	2024	477
RTOR Reduction (vph)	0	0	107	0	75	0	0	2	0	0	0	135
Lane Group Flow (vph)	342	343	316	47	66	0	386	2167	0	80	2024	342
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	8	8	5	4	4		5	2		1	6	8
Permitted Phases			8									6
Actuated Green, G (s)	26.9	26.9	44.1	7.7	7.7		17.2	52.2		9.2	44.2	71.1
Effective Green, g (s)	26.9	26.9	44.1	7.7	7.7		17.2	52.2		9.2	44.2	71.1
Actuated g/C Ratio	0.22	0.22	0.37	0.06	0.06		0.14	0.44		0.08	0.37	0.59
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2		1.0	0.2	2.0
Lane Grp Cap (vph)	376	380	581	113	207		492	2205		135	1872	1030
v/s Ratio Prot	c0.20	0.20	0.08	c0.03	0.02		c0.11	c0.43		0.05	c0.40	0.07
v/s Ratio Perm			0.12									0.14
v/c Ratio	0.91	0.90	0.54	0.42	0.32		0.78	0.98		0.59	1.08	0.33
Uniform Delay, d1	45.4	45.3	30.0	54.0	53.6		49.6	33.5		53.6	37.9	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.43	1.04	1.04
Incremental Delay, d2	24.6	23.5	0.6	0.9	0.3		7.4	15.5		2.9	43.4	0.0
Delay (s)	70.0	68.7	30.6	54.9	54.0		57.0	49.0		79.6	82.7	12.9
Level of Service	E	E	C	D	D		E	D		E	F	B
Approach Delay (s)		54.5			54.2			50.2			69.7	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay							58.9					
HCM 2000 Volume to Capacity ratio							0.93					
Actuated Cycle Length (s)							120.0					
Intersection Capacity Utilization							87.7%					
Analysis Period (min)							15					
c Critical Lane Group												

Palmerae 07/03/2015 Total 2023 PM - 6040 Split Mitigated
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HCM 6th Roundabout
3: Indian Bend Rd. & Scottsdale Plaza Resort

08/06/2020

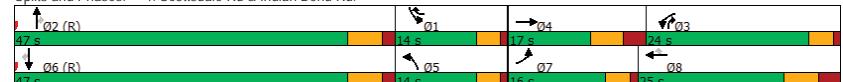
Intersection	EB	WB	NB	SB
Intersection Delay, s/veh	7.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	285	688	295	10
Demand Flow Rate, veh/h	290	702	301	10
Vehicles Circulating, veh/h	406	19	279	709
Vehicles Exiting, veh/h	313	561	417	12
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.5	8.2	6.4	5.5
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	290	702	301	10
Cap Entry Lane, veh/h	912	1353	1038	670
Entry HV Adj Factor	0.982	0.980	0.980	1.000
Flow Entry, veh/h	285	688	295	10
Cap Entry, veh/h	895	1327	1017	670
V/C Ratio	0.318	0.519	0.290	0.015
Control Delay, s/veh	7.5	8.2	6.4	5.5
LOS	A	A	A	A
95th %tile Queue, veh	1	3	1	0

Timings
4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑↑↑	↑↑	↑↑	↑↑↑↑	↑↑
Traffic Volume (vph)	227	248	501	296	256	288	1433	525	214	1508	193
Future Volume (vph)	227	248	501	296	256	288	1433	525	214	1508	193
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	3	8	1	5	2	3	1	6	
Permitted Phases					8			2			6
Detector Phase	7	4	3	8	1	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0	20.0
Minimum Split (s)	8.5	13.0	8.5	13.0	9.4	9.5	29.4	8.5	9.4	29.4	29.4
Total Split (s)	16.0	17.0	24.0	25.0	14.0	14.0	47.0	24.0	14.0	47.0	47.0
Total Split (%)	15.7%	16.7%	23.5%	24.5%	13.7%	13.7%	46.1%	23.5%	13.7%	46.1%	46.1%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4	4.4
All-Red Time (s)	1.0	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	C-Max	None	None	C-Max	C-Max	
Act Effct Green (s)	10.2	10.0	19.5	19.3	32.3	10.0	41.5	67.0	10.0	41.5	41.5
Actuated g/C Ratio	0.10	0.10	0.19	0.19	0.32	0.10	0.41	0.66	0.10	0.41	0.41
v/c Ratio	0.72	1.04	0.83	0.91	0.50	0.93	0.75	0.54	0.69	0.79	0.29
Control Delay	56.4	90.5	51.6	72.9	17.0	82.8	30.2	11.4	56.2	30.2	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	90.5	51.6	72.9	17.0	82.8	30.2	11.4	56.2	30.2	8.1
LOS	E	F	D	E	B	F	C	B	E	C	A
Approach Delay		78.1		49.2			32.5			30.8	
Approach LOS	E		D			C			C		
Intersection Summary											
Cycle Length: 102											
Actuated Cycle Length: 102											
Offset: 0 (0%) Referenced to phase 2:NBT and 6:SBT, Start of Green											
Natural Cycle: 75											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.04											
Intersection Signal Delay: 39.9											
Intersection LOS: D											
Intersection Capacity Utilization 80.8%											
ICU Level of Service D											
Analysis Period (min) 15											

Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.



Palmerae 07/03/2015 Total 2023 Sat - 6040 Split

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HCM 6th Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	227	248	151	501	296	256	288	1433	525	214	1508	193
Future Volume (veh/h)	227	248	151	501	296	256	288	1433	525	214	1508	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No	No	No	No	No	No	No
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	247	270	164	545	322	278	313	1558	571	233	1639	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	211	124	609	399	815	1040	2052	917	1040	2052	637
Arrive On Green	0.09	0.10	0.10	0.18	0.21	0.21	0.30	0.40	0.40	0.30	0.40	0.40
Sat Flow, veh/h	3456	2152	1267	3456	1870	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	247	221	213	545	322	278	313	1558	571	233	1639	210
Grp Sat Flow(s), veh/h/in	1728	1777	1642	1728	1870	1585	1728	1702	1585	1728	1702	1585
Q Serve(g_s), s	7.1	10.0	10.0	15.7	16.7	2.8	7.1	26.8	6.2	5.2	28.8	9.7
Cycle Q Clear(g_c), s	7.1	10.0	10.0	15.7	16.7	2.8	7.1	26.8	6.2	5.2	28.8	9.7
Prop In Lane	1.00	0.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	312	174	161	609	399	815	1040	2052	917	1040	2052	637
V/C Ratio(X)	0.79	1.27	1.32	0.89	0.81	0.34	0.30	0.76	0.62	0.22	0.80	0.33
Avail Cap(c_a), veh/h	407	174	161	678	399	815	1040	2052	917	1040	2052	637
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay(d), s/veh	45.5	46.0	46.0	41.1	38.1	14.2	27.4	26.2	14.2	26.7	26.9	22.8
Incr Delay (d2), s/veh	5.8	159.1	180.9	12.7	10.7	0.1	0.1	2.7	3.2	0.0	3.4	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/h/in	3.3	12.1	12.1	7.7	8.7	3.4	2.9	11.0	8.9	2.1	11.9	3.8
Unsig. Movement Delay, s/veh	51.2	205.1	226.9	53.8	48.8	14.3	27.5	28.9	17.4	26.8	30.2	24.2
LnGrp Delay(d), s/veh	D	F	F	D	D	B	C	C	B	C	C	C
Approach Vol, veh/h	681			1145			2442			2082		
Approach Delay, s/veh	156.1			42.8			26.0			29.2		
Approach LOS	F			D			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	34.8	47.0	25.0	17.0	34.8	47.0	13.2	28.8				
Change Period (Y+Rc), s	* 4	6.0	* 7	* 7	* 4	6.0	4.0	* 7				
Max Green Setting (Gmax), s	* 10	41.0	* 20	* 10	* 10	41.0	12.0	* 18				
Max Q Clear Time (g_c+l1), s	7.2	28.8	17.7	12.0	9.1	30.8	9.1	18.7				
Green Ext Time (p_c), s	0.1	2.4	0.2	0.0	0.0	2.6	0.1	0.0				

Intersection Summary

HCM 6th Ctrl Delay 44.1

HCM 6th LOS D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC

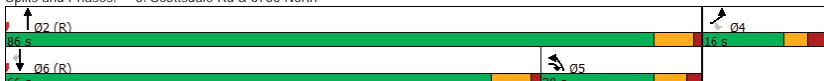
5: Scottsdale Rd & Joshua Tree Ln

08/06/2020

Intersection						
Int Delay, s/veh 0.6						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↑	↑↑↑	↑	↑↑↑	↑↑↑
Traffic Vol, veh/h	4	10	2251	7	6	2110
Future Vol, veh/h	4	10	2251	7	6	2110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	11	2447	8	7	2293
Major/Minor						
Conflicting Flow All		3382	1228	0	0	2455
Stage 1		2451	-	-	-	-
Stage 2		931	-	-	-	-
Critical Hdwy		5.74	7.14	-	-	5.34
Critical Hdwy Stg 1		6.64	-	-	-	-
Critical Hdwy Stg 2		6.04	-	-	-	-
Follow-up Hdwy		3.82	3.92	-	-	3.12
Pot Cap-1 Maneuver		16	146	-	-	73
Stage 1		29	-	-	-	-
Stage 2		311	-	-	-	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver		14	146	-	-	73
Mov Cap-2 Maneuver		14	-	-	-	-
Stage 1		29	-	-	-	-
Stage 2		281	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, s		142.3		0		
HCM LOS		F				
Minor Lane/Major Mvmt						
Capacity (veh/h)		-		40 73 -		
HCM Lane V/C Ratio		-		0.38 0.089 -		
HCM Control Delay (s)		-		142.3 59.1 -		
HCM Lane LOS		-		F F -		
HCM 95th %tile Q(veh)		-		1.3 0.3 -		

Timings
6: Scottsdale Rd & 6750 North

08/06/2020

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (vph)	114	195	198	2110	2123	45
Future Volume (vph)	114	195	198	2110	2123	45
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases						6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	10.0	10.0	36.0	36.9	36.9
Total Split (s)	16.0	20.0	20.0	86.0	66.0	66.0
Total Split (%)	15.7%	19.6%	19.6%	84.3%	64.7%	64.7%
Yellow Time (s)	3.0	4.0	4.0	4.9	4.9	4.9
All-Red Time (s)	3.0	2.0	2.0	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Efftct Green (s)	8.0	28.0	14.0	82.0	62.0	62.0
Actuated g/C Ratio	0.08	0.27	0.14	0.80	0.61	0.61
v/c Ratio	0.46	0.28	0.46	0.56	0.75	0.05
Control Delay	50.3	28.7	35.1	1.1	15.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	28.7	35.1	1.1	15.3	4.0
LOS	D	C	D	A	B	A
Approach Delay	36.7			4.1	15.1	
Approach LOS	D			A	B	
Intersection Summary						
Cycle Length: 102						
Actuated Cycle Length: 102						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 95						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.75						
Intersection Signal Delay: 11.2			Intersection LOS: B			
Intersection Capacity Utilization 65.8%			ICU Level of Service C			
Analysis Period (min) 15						
Splits and Phases: 6: Scottsdale Rd & 6750 North						
						

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
CivTech - BR

Synchro 10 Report
Page 6

HCM 6th Signalized Intersection Summary
6: Scottsdale Rd & 6750 North

08/06/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	114	195	198	2110	2123	45
Future Volume (veh/h)	114	195	198	2110	2123	45
Initial Q (Q _b) veh	0	0	0	0	0	0
Ped-Bike Adj(A, pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	124	212	215	2293	2308	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	200	656	613	4210	3004	932
Arrive On Green	0.06	0.06	0.35	1.00	1.00	1.00
Sat Flow, veh/h	3456	2790	3456	5274	5274	1585
Grp Volume(v), veh/h	124	212	215	2293	2308	49
Grp Sat Flow(s), veh/h/ln	1728	1395	1728	1702	1702	1585
Q Serve(g_s), s	3.6	0.0	4.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.6	0.0	4.7	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	200	656	613	4210	3004	932
V/C Ratio(X)	0.62	0.32	0.35	0.54	0.77	0.05
Avail Cap(c_a), veh/h	339	769	613	4210	3004	932
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.0	32.3	28.6	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.1	0.3	0.5	2.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.6	3.0	1.8	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	48.1	32.4	28.9	0.5	2.0	0.1
LnGrp LOS	D	C	C	A	A	A
Approach Vol, veh/h	336			2508	2357	
Approach Delay, s/veh	38.2			2.9	1.9	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+Rc), s	90.1		11.9	24.1	66.0	
Change Period (Y+Rc), s	* 6		6.0	* 6	6.0	
Max Green Setting (Gmax), s	* 80		10.0	* 14	60.0	
Max Q Clear Time (g_c+H1), s	2.0		5.6	6.7	2.0	
Green Ext Time (p_c), s	5.4		0.3	0.4	5.4	
Intersection Summary						
HCM 6th Ctrl Delay				4.8		
HCM 6th LOS				A		
Notes						
User approved pedestrian interval to be less than phase max green.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
CivTech - BR

Synchro 10 Report
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Timings
10: Quail Run Road & Lincoln Dr

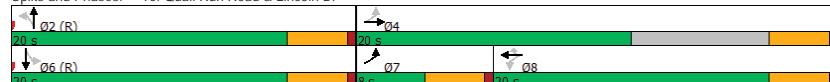
08/06/2020

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	Ø2
Lane Configurations	↑	↑↓	↑↑	↑	↑	↑↓	
Traffic Volume (vph)	316	17	24	9	7	0	
Future Volume (vph)	316	17	24	9	7	0	
Turn Type	pmt+pt	NA	NA	Perm	Perm	NA	
Protected Phases	7	4	8		6	2	
Permitted Phases	4		8	6			
Detector Phase	7	4	8	8	6	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	
Total Split (%)	16.7%	41.7%	41.7%	41.7%	41.7%	42%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max
Act Efft Green (s)	24.0	24.0	16.0	16.0	16.0	16.0	
Actuated g/C Ratio	0.50	0.50	0.33	0.33	0.33	0.33	
v/c Ratio	0.57	0.01	0.02	0.02	0.02	0.25	
Control Delay	12.1	6.1	10.9	0.0	11.0	0.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.1	6.1	10.9	0.0	11.0	0.5	
LOS	B	A	B	A	B	A	
Approach Delay	11.8	7.9			0.8		
Approach LOS	B	A			A		

Intersection Summary

Cycle Length: 48
Actuated Cycle Length: 48
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Prelimed
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 6.8
Intersection Capacity Utilization 47.6%
Analysis Period (min) 15

Splits and Phases: 10: Quail Run Road & Lincoln Dr



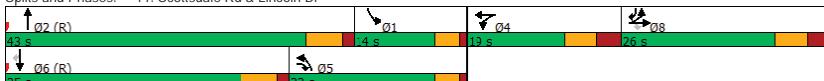
HCM 6th Signalized Intersection Summary
10: Quail Run Road & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑↑	↑	↑↓	↑	↑↓	↑	↑	↑↓	
Traffic Volume (veh/h)	316	17	0	0	24	9	0	0	0	7	0
Future Volume (veh/h)	316	17	0	0	24	9	0	0	0	7	0
Initial Q (Q _b) veh	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No								
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	343	18	0	0	26	10	0	0	0	8	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	749	1777	0	150	1185	528	0	623	0	744	0
Arrive On Green	0.08	0.50	0.00	0.00	0.33	0.33	0.00	0.00	0.00	0.33	0.00
Sat Flow, veh/h	1781	3647	0	1395	3554	1585	0	1870	0	1781	0
Grp Volume(v), veh/h	343	18	0	0	26	10	0	0	0	8	0
Grp Sat Flow(s), veh/h/ln	1781	1777	0	1395	1777	1585	0	1870	0	1781	0
Q Serve(g_s), s	4.0	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.1	0.0
Cycle Q Clear(g_c), s	4.0	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.1	0.0
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	1.00	1.00
Lane Grp Cap(c), veh/h	749	1777	0	150	1185	528	0	623	0	744	0
V/C Ratio(X)	0.46	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.01	0.00
Avail Cap(c_a), veh/h	749	1777	0	150	1185	528	0	623	0	744	0
HCM Platoons Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.4	6.0	0.0	0.0	10.7	10.7	0.0	0.0	0.0	10.7	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	2.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0
Unsig. Movement Delay, s/veh											
LnGrp Delay(d), s/veh	11.5	6.0	0.0	0.0	10.8	10.8	0.0	0.0	0.0	10.7	0.0
LnGrp LOS	B	A	A	A	B	B	A	A	A	B	A
Approach Vol, veh/h	361				36				0	303	
Approach Delay, s/veh	11.2				10.8				0.0	17.1	
Approach LOS	B				B					B	
Timer - Assigned Phs	2				4				6		
Phs Duration (G+Y+Rc), s	20.0				28.0				20.0		
Change Period (Y+Rc), s	4.0				4.0				4.0		
Max Green Setting (Gmax), s	16.0				16.0				4.0		
Max Q Clear Time (g_c+H1), s	0.0				2.1				9.3		
Green Ext Time (p_c), s	0.0				0.0				1.0		
Intersection Summary											
HCM 6th Ctrl Delay									13.7		
HCM 6th LOS									B		

Timings
11: Scottsdale Rd & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	463	58	329	42	36	253	1656	76	1805	439
Future Volume (vph)	463	58	329	42	36	253	1656	76	1805	439
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases			8							6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.5	5.0	5.0	4.5	20.0	4.5	20.0	8.0
Minimum Split (s)	40.0	40.0	9.0	40.0	40.0	9.0	28.0	9.0	28.0	40.0
Total Split (s)	26.0	26.0	22.0	19.0	19.0	22.0	43.0	14.0	35.0	26.0
Total Split (%)	25.5%	25.5%	21.6%	18.6%	18.6%	21.6%	42.2%	13.7%	34.3%	25.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag		Lag	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	None	
Act Effct Green (s)	21.9	21.9	39.8	7.2	7.2	14.9	42.8	7.8	34.0	61.9
Actuated g/C Ratio	0.21	0.21	0.39	0.07	0.07	0.15	0.42	0.08	0.33	0.61
v/c Ratio	0.78	0.78	0.49	0.37	0.43	0.55	0.88	0.61	1.16	0.43
Control Delay	54.2	53.6	7.7	52.7	20.4	44.1	34.9	58.9	122.3	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	53.6	7.7	52.7	20.4	44.1	34.9	58.9	122.3	14.4
LOS	D	D	A	D	C	D	C	E	F	B
Approach Delay		36.0			28.8		36.1		99.8	
Approach LOS		D			C		D		F	
Intersection Summary										
Cycle Length: 102										
Actuated Cycle Length: 102										
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.16										
Intersection Signal Delay: 63.8										
Intersection LOS: E										
Intersection Capacity Utilization 80.6%										
ICU Level of Service D										
Analysis Period (min) 15										
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr										
										

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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HCM Signalized Intersection Capacity Analysis
11: Scottsdale Rd & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	463	58	329	42	36	86	253	1656	56	76	1805	439
Future Volume (vph)	463	58	329	42	36	86	253	1656	56	76	1805	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.97	0.91	1.00	0.91	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.89	1.00	1.00	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1703	1583	1770	3165	3433	5060	1770	5085	1583		
Flt Permitted	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1703	1583	1770	3165	3433	5060	1770	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	503	63	358	46	39	93	275	1800	61	83	1962	477
RTOR Reduction (vph)	0	0	122	0	86	0	0	3	0	0	0	174
Lane Group Flow (vph)	282	284	236	46	46	0	275	1858	0	83	1962	303
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA	Prot	NA	pm+ov	
Protected Phases	8	8	5	4	4		5	2	1	6	8	6
Permitted Phases			8									
Actuated Green, G (s)	21.9	21.9	37.6	7.2	7.2		15.7	42.0		6.9	33.2	55.1
Effective Green, g (s)	21.9	21.9	37.6	7.2	7.2		15.7	42.0		6.9	33.2	55.1
Actuated g/C Ratio	0.21	0.21	0.37	0.07	0.07		0.15	0.41		0.07	0.33	0.54
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2		1.0	0.2	2.0
Lane Grp Cap (vph)	360	365	583	124	223		528	2083		119	1655	963
v/s Ratio Prot	c0.17	0.17	0.06	c0.03	0.01		c0.08	c0.37		0.05	c0.39	0.07
v/s Ratio Perm			0.09									0.12
v/c Ratio	0.78	0.78	0.40	0.37	0.20		0.52	0.89		0.70	1.19	0.31
Uniform Delay, d1	37.8	37.8	23.9	45.2	44.7		39.7	27.9		46.5	34.4	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.59	4.98
Incremental Delay, d2	9.9	9.2	0.2	0.7	0.2		0.4	6.3		9.6	88.1	0.0
Delay (s)	47.7	46.9	24.1	45.9	44.9		40.1	34.2		56.2	142.7	64.7
Level of Service	D	D	C	D	D		D	C		E	F	E
Approach Delay (s)		38.3			45.1			35.0			125.1	
Approach LOS		D			D			C		F		
Intersection Summary												
HCM 2000 Control Delay							75.3					
HCM 2000 Volume to Capacity ratio							0.88					
Actuated Cycle Length (s)							102.0			24.0		
Intersection Capacity Utilization							80.6%			D		
Analysis Period (min)							15					
c = Critical Lane Group												

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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HCM 6th TWSC
14: Street A (Access A) & Indian Bend Rd.

08/06/2020

Intersection						
Int Delay, s/veh	6.9					
Movement	EBT	EBC	WBL	WBT	NBL	NBR
Lane Configurations	↑		↑↑	↑↑	↑↑	↑↑
Traffic Vol, veh/h	17	87	129	15	82	120
Future Vol, veh/h	17	87	129	15	82	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	95	140	16	89	130
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	113	0	362	66
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	296	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1476	-	637	998
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	755	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1476	-	576	998
Mov Cap-2 Maneuver	-	-	-	-	576	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	683	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	6.9	10.4			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBC	WBL	WBT
Capacity (veh/h)	576	998	-	-	1476	-
HCM Lane V/C Ratio	0.155	0.131	-	-	0.095	-
HCM Control Delay (s)	12.4	9.1	-	-	7.7	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0.3	-

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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HCM 6th TWSC
15: Scottsdale Rd & Street B (Access B)

08/06/2020

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBC	NBL	NBT	SBT	SBR
Lane Configurations	↑		↑↑↑	↑↑↑	↑↑↑	↑↑↑
Traffic Vol, veh/h	0	95	0	382	193	131
Future Vol, veh/h	0	95	0	382	193	131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	103	0	415	210	142
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	176	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	712	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	712	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	10.9	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	712	-	-		
HCM Lane V/C Ratio	-	0.145	-	-		
HCM Control Delay (s)	-	10.9	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0.5	-	-		

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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HCM 6th TWSC
16: Scottsdale Rd & Tuckey Ln

08/06/2020

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑		Y	↑↑
Traffic Vol, veh/h	8	8	2286	0	3	2323
Future Vol, veh/h	8	8	2286	0	3	2323
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	9	2485	0	3	2525
Major/Minor						
Minor1		Major1		Major2		
Conflicting Flow All	3501	1243	0	0	2485	0
Stage 1	2485	-	-	-	-	-
Stage 2	1016	-	-	-	-	-
Critical Hdwy	5.74	7.14	-	-	5.34	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	14	142	-	-	70	-
Stage 1	27	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	13	142	-	-	70	-
Mov Cap-2 Maneuver	13	-	-	-	-	-
Stage 1	27	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Approach						
WB		NB		SB		
HCM Control Delay, \$	322.7	0	0	0.1		
HCM LOS	F					
Minor Lane/Major Mvmt						
NBT		NBR		WBLn1		
Capacity (veh/h)	-	-	24	70	-	-
HCM Lane V/C Ratio	-	-	0.725	0.047	-	-
HCM Control Delay (s)	-	-	\$ 322.7	58.9	-	-
HCM Lane LOS	-	-	F	F	-	-
HCM 95th %tile Q(veh)	-	-	2.2	0.1	-	-
Notes						
-: Volume exceeds capacity	\$: Delay exceeds 300s	+:	Computation Not Defined	*	All major volume in platoon	

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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HCM 6th TWSC
21:

08/06/2020

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBC	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	612	1	0	633	0	15
Future Vol, veh/h	612	1	0	633	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	665	1	0	688	0	16
Major/Minor						
Major1		Major2		Minor1		
Conflicting Flow All	0	0	-	-	-	333
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	663
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	663
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach						
EB		WB		NB		
HCM Control Delay, \$	0	0	0	0	10.6	
HCM LOS					B	
Minor Lane/Major Mvmt						
NBLn1		EBT		WBT		
Capacity (veh/h)	663	-	-	-	-	-
HCM Lane V/C Ratio	0.025	-	-	-	-	-
HCM Control Delay (s)	10.6	-	-	-	-	-
HCM Lane LOS	B	-	-	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	-

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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HCM 6th TWSC
37: 6750 North & Street C

08/06/2020

Intersection													
Int Delay, s/veh 17.9													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↑	↓	↑	↓	↑	↓	↑	↓	↑	↓	↑	↓	
Traffic Vol, veh/h	11	45	2	4	54	82	1	265	3	73	366	10	
Future Vol, veh/h	11	45	2	4	54	82	1	265	3	73	366	10	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	None	-	-	None	-	-	None	-	
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	0	-	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	12	49	2	4	59	89	1	288	3	79	398	11	
Major/Minor													
Major1		Major2		Minor1		Minor2							
Conflicting Flow All	148	0	0	51	0	0	390	230	50	332	187	104	
Stage 1	-	-	-	-	-	-	74	74	-	112	112	-	
Stage 2	-	-	-	-	-	-	316	156	-	220	75	-	
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-	
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318	
Pot Cap-1 Maneuver	1434	-	-	1555	-	-	569	670	1018	621	708	951	
Stage 1	-	-	-	-	-	-	935	833	-	893	803	-	
Stage 2	-	-	-	-	-	-	695	769	-	782	833	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1434	-	-	1555	-	-	307	663	1018	406	700	951	
Mov Cap-2 Maneuver	-	-	-	-	-	-	307	663	-	406	700	-	
Stage 1	-	-	-	-	-	-	928	826	-	886	801	-	
Stage 2	-	-	-	-	-	-	345	767	-	503	826	-	
Approach													
EB		WB		NB		SB							
HCM Control Delay, s	1.4	-	-	0.2	-	-	14.6	-	-	27.6	-	-	-
HCM LOS	-	-	-	B	-	-	D	-	-	-	-	-	-
Minor Lane/Major Mvmt													
NBLn1		EBL		EBT		EBR		WBL		WBT		SBLn1	
Capacity (veh/h)	663	1434	-	-	1555	-	-	630	-	-	-	-	-
HCM Lane V/C Ratio	0.441	0.008	-	-	0.003	-	-	0.775	-	-	-	-	-
HCM Control Delay (s)	14.6	7.5	-	-	7.3	-	-	27.6	-	-	-	-	-
HCM Lane LOS	B	A	-	-	A	-	-	D	-	-	-	-	-
HCM 95th %tile Q(veh)	2.3	0	-	-	0	-	-	7.3	-	-	-	-	-

Palmerae 07/03/2015 Total 2023 Sat - 6040 Split
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Timings
4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	227	248	501	296	256	288	1433	525	214	1508	193
Future Volume (vph)	227	248	501	296	256	288	1433	525	214	1508	193
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	3	8	1	5	2	3	1	6	6
Permitted Phases	-	-	-	-	-	-	-	-	-	-	-
Detector Phase	7	4	3	8	1	5	2	3	1	6	6
Switch Phase	-	-	-	-	-	-	-	-	-	-	-
Minimum Initial (s)	4.0	6.0	4.0	6.0	4.0	4.0	20.0	4.0	4.0	20.0	20.0
Minimum Split (s)	8.5	13.0	8.5	13.0	9.4	9.5	29.4	8.5	9.4	29.4	29.4
Total Split (s)	22.0	23.0	24.0	25.0	9.0	9.0	46.0	24.0	9.0	46.0	46.0
Total Split (%)	21.6%	22.5%	23.5%	24.5%	8.8%	8.8%	45.1%	23.5%	8.8%	45.1%	45.1%
Yellow Time (s)	3.0	4.2	3.0	4.2	3.0	3.0	4.4	3.0	3.0	4.4	4.4
All-Red Time (s)	1.0	2.8	1.0	2.8	1.0	1.0	1.6	1.0	1.0	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes										
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	10.8	13.4	20.2	22.9	30.9	5.0	42.4	68.6	5.0	42.4	42.4
Actuated g/C Ratio	0.11	0.13	0.20	0.22	0.30	0.05	0.42	0.67	0.05	0.42	0.42
v/c Ratio	0.68	0.83	0.80	0.77	0.52	1.86	0.74	0.52	1.39	0.78	0.28
Control Delay	53.5	47.4	49.1	51.1	20.5	439.7	29.4	9.9	244.1	29.4	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	47.4	49.1	51.1	20.5	439.7	29.4	9.9	244.1	29.4	8.4
LOS	D	D	D	C	F	C	A	F	C	A	D
Approach Delay	-	-	-	-	-	-	-	-	-	-	-
Approach LOS	D	D	D	D	E	D	D	D	D	D	D

Intersection Summary

Cycle Length: 102

Actuated Cycle Length: 102

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.86

Intersection Signal Delay: 59.6

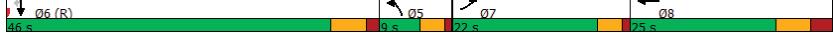
Intersection LOS: E

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Scottsdale Rd & Indian Bend Rd.



Palmerae 07/03/2015 Total 2023 Sat - 6040 Split Mitigated

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HCM 6th Signalized Intersection Summary

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	227	248	151	501	296	256	288	1433	525	214	1508	193
Future Volume (veh/h)	227	248	151	501	296	256	288	1433	525	214	1508	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No	No	No	No	No	No						
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	247	270	164	545	322	278	313	1558	571	233	1639	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	314	318	187	609	491	522	230	2002	901	230	2002	622
Arrive On Green	0.09	0.15	0.18	0.26	0.26	0.07	0.39	0.39	0.07	0.39	0.39	0.39
Sat Flow, veh/h	3456	2152	1267	3456	1870	1585	3456	5106	1585	3456	5106	1585
Grp Volume(v), veh/h	247	221	213	545	322	278	313	1558	571	233	1639	210
Grp Sat Flow(s), veh/h/ln	1728	1777	1642	1728	1870	1728	1728	1728	1728	1728	1728	1585
Q Serve(g_s), s	7.1	12.4	12.9	15.7	15.6	5.8	6.8	27.2	6.8	6.8	29.3	6.8
Cycle Q Clear(g_c), s	7.1	12.4	12.9	15.7	15.6	5.8	6.8	27.2	6.8	6.8	29.3	6.8
Prop In Lane	1.00	0.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	314	263	243	609	491	522	230	2002	901	230	2002	622
V/C Ratio(X)	0.79	0.84	0.88	0.89	0.66	0.53	1.36	0.78	0.63	1.01	0.82	0.34
Avail Cap(c_a), veh/h	610	279	258	678	491	522	230	2002	901	230	2002	622
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	42.3	42.5	41.1	33.5	15.8	47.6	27.1	14.8	47.6	27.8	11.2
Incr Delay (d2), s/veh	1.7	18.2	24.7	12.7	2.5	0.6	187.7	3.1	3.4	62.7	3.9	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	3.1	6.7	6.9	7.7	7.3	5.4	8.9	11.3	9.2	4.9	12.2	0.3
Unsig. Movement Delay, s/veh												
LnGp Delay(d), s/veh	47.1	60.5	67.2	53.8	36.0	16.4	235.4	30.2	18.2	110.3	31.6	12.7
LnGp LOS	D	E	E	D	D	B	F	C	B	F	C	B
Approach Vol, veh/h		681			1145			2442			2082	
Approach Delay, s/veh		57.7			39.7			53.7			38.5	
Approach LOS		E			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.8	46.0	25.0	22.1	10.8	46.0	13.3	33.8				
Change Period (Y+Rc), s	*4	6.0	*7	*7	*4	6.0	4.0	*7				
Max Green Setting (Gmax), s	*5	40.0	*20	*16	*5	40.0	18.0	*18				
Max Q Clear Time (g_c+l1), s	8.8	29.2	17.7	14.9	8.8	31.3	9.1	17.6				
Green Ext Time (p_c), s	0.0	2.4	0.2	0.1	0.0	2.4	0.1	0.1				
Intersection Summary												
HCM 6th Ctrl Delay					46.6							
HCM 6th LOS					D							
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

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Timings

6: Scottsdale Rd & 6750 North

08/06/2020

Lane Group	EBL	EBC	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	114	195	198	2110	2123	45
Future Volume (vph)	114	195	198	2110	2123	45
Turn Type	Prot	pm+ov	Prot	NA	NA	Perm
Protected Phases	4	5	5	2	6	
Permitted Phases						6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	4.0	4.0	10.0	10.0	10.0
Minimum Split (s)	36.2	10.0	10.0	36.0	36.9	36.9
Total Split (s)	16.0	20.0	20.0	86.0	66.0	66.0
Total Split (%)	15.7%	19.6%	19.6%	84.3%	64.7%	64.7%
Yellow Time (s)	3.0	4.0	4.0	4.9	4.9	4.9
All-Red Time (s)	3.0	2.0	2.0	1.1	1.1	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	
Act Effct Green (s)	8.0	28.0	14.0	82.0	62.0	62.0
Actuated g/C Ratio	0.08	0.27	0.14	0.80	0.61	0.61
v/c Ratio	0.46	0.28	0.46	0.56	0.75	0.05
Control Delay	50.3	28.7	33.8	0.8	15.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	28.7	33.8	0.8	15.4	4.0
LOS	D	C	C	A	B	A
Approach Delay		36.7			3.7	15.1
Approach LOS		D			A	B
Intersection Summary						
Cycle Length: 102						
Actuated Cycle Length: 102						
Offset: 0 (0%) Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 95						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.75						
Intersection Signal Delay: 11.0					Intersection LOS: B	
Intersection Capacity Utilization 65.8%					ICU Level of Service C	
Analysis Period (min) 15						
Splits and Phases: 6: Scottsdale Rd & 6750 North						

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HCM 6th Signalized Intersection Summary

6: Scottsdale Rd & 6750 North

08/06/2020

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑
Traffic Volume (veh/h)	114	195	198	2110	2123	45
Future Volume (veh/h)	114	195	198	2110	2123	45
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No		No	No		
Adj Sat Flow, veh/h/in	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	124	212	215	2293	2308	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	200	656	613	4210	3004	932
Arrive On Green	0.06	0.06	0.35	1.00	1.00	
Sat Flow, veh/h	3456	2790	3456	5274	5274	1585
Grp Volume(v), veh/h	124	212	215	2293	2308	49
Grp Sat Flow(s), veh/h/in	1728	1395	1728	1702	1702	1585
Q Serve(g_s), s	3.6	0.0	4.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.6	0.0	4.7	0.0	0.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	200	656	613	4210	3004	932
V/C Ratio(X)	0.62	0.32	0.35	0.54	0.77	0.05
Avail Cap(c_a), veh/h	339	769	613	4210	3004	932
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	47.0	32.3	28.6	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.1	0.3	0.5	2.0	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/in	1.6	3.0	1.8	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGp Delay(d), s/veh	48.1	32.4	28.9	0.5	2.0	0.1
LnGp LOS	D	C	C	A	A	A
Approach Vol, veh/h	336		2508	2357		
Approach Delay, s/veh	38.2		2.9	1.9		
Approach LOS	D		A	A		
Timer - Assigned Phs	2		4	5	6	
Phs Duration (G+Y+Rc), s	90.1		11.9	24.1	66.0	
Change Period (Y+Rc), s	* 6		6.0	* 6	6.0	
Max Green Setting (Gmax), s	* 80		10.0	* 14	60.0	
Max Q Clear Time (g_c+l1), s	2.0		5.6	6.7	2.0	
Green Ext Time (p_c), s	5.4		0.3	0.4	5.4	
Intersection Summary						
HCM 6th Ctrl Delay			4.8			
HCM 6th LOS			A			
Notes						
User approved pedestrian interval to be less than phase max green.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

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Timings

11: Scottsdale Rd & Lincoln Dr

08/06/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↑↑	↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑
Traffic Volume (vph)	463	58	329	42	36	253	1656	76	1805	439
Future Volume (vph)	463	58	329	42	36	253	1656	76	1805	439
Turn Type	Split	NA	pm+ov	Split	NA	Prot	NA	Prot	NA	pm+ov
Protected Phases	8	8	5	4	4	5	2	1	6	8
Permitted Phases										6
Detector Phase	8	8	5	4	4	5	2	1	6	8
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.5	5.0	5.0	4.5	20.0	4.5	20.0	8.0
Minimum Split (s)	40.0	40.0	9.0	40.0	9.0	28.0	9.0	28.0	40.0	
Total Split (s)	26.0	26.0	13.0	19.0	19.0	13.0	43.0	14.0	44.0	26.0
Total Split (%)	25.5%	25.5%	12.7%	18.6%	18.6%	12.7%	42.2%	13.7%	43.1%	25.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.5	3.0	4.5	4.0
All-Red Time (s)	3.0	3.0	1.0	3.0	3.0	1.0	1.5	1.0	1.5	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	6.0	4.0	6.0	7.0
Lead/Lag			Lag			Lag	Lead	Lag	Lead	
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
Act Effct Green (s)	21.5	21.5	33.5	7.2	7.2	9.0	42.1	8.9	40.3	67.8
Actuated g/C Ratio	0.21	0.21	0.33	0.07	0.07	0.09	0.41	0.09	0.40	0.66
v/c Ratio	0.80	0.79	0.57	0.37	0.43	0.91	0.89	0.54	0.98	0.40
Control Delay	56.0	55.4	13.8	52.7	20.4	80.4	36.2	52.7	54.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	55.4	13.8	52.7	20.4	80.4	36.2	52.7	54.2	9.0
LOS	E	E	B	D	C	F	D	D	D	A
Approach Delay			39.5			28.8		41.9		45.6
Approach LOS			D			C		D		D
Intersection Summary										
Cycle Length: 102										
Actuated Cycle Length: 102										
Offset: 0 (0%) Referenced to phase 2:NBT and 6:SBT, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.98										
Intersection Signal Delay: 42.7										
Intersection LOS: D										
Intersection Capacity Utilization 80.6%										
ICU Level of Service D										
Analysis Period (min) 15										
Splits and Phases: 11: Scottsdale Rd & Lincoln Dr										

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HCM Signalized Intersection Capacity Analysis

11: Scottsdale Rd & Lincoln Dr

08/06/2020

Movement	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↘	↗	↖	↖	↑	↑	↖	↑↑↑	↖
Traffic Volume (vph)	463	58	329	42	36	86	253	1656	56	76	1805	439
Future Volume (vph)	463	58	329	42	36	86	253	1656	56	76	1805	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1703	1583	1770	3165		3433	5060		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1703	1583	1770	3165		3433	5060		1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92		0.92	0.92		0.92	0.92	0.92
Adj. Flow (vph)	503	63	358	46	39	93	275	1800	61	83	1962	477
RTOR Reduction (vph)	0	0	113	0	86	0	0	3	0	0	0	167
Lane Group Flow (vph)	282	284	245	46	46	0	275	1858	0	83	1962	310
Turn Type	Split	NA	pm+ov	Split	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	8	8	5	4	4		5	2		1	6	8
Permitted Phases			8									6
Actuated Green, G (s)	21.5	21.5	31.3	7.2	7.2		9.8	41.3		8.0	39.5	61.0
Effective Green, g (s)	21.5	21.5	31.3	7.2	7.2		9.8	41.3		8.0	39.5	61.0
Actuated g/C Ratio	0.21	0.21	0.31	0.07	0.07		0.10	0.40		0.08	0.39	0.60
Clearance Time (s)	7.0	7.0	4.0	7.0	7.0		4.0	6.0		4.0	6.0	7.0
Vehicle Extension (s)	2.0	2.0	1.0	2.0	2.0		1.0	0.2		1.0	0.2	2.0
Lane Grp Cap (vph)	354	358	485	124	223		329	2048		138	1969	1055
v/s Ratio Prot	c0.17	0.17	0.05	c0.03	0.01		c0.08	0.37		0.05	c0.39	0.06
v/s Ratio Perm			0.11									0.13
v/c Ratio	0.80	0.79	0.51	0.37	0.20		0.84	0.91		0.60	1.00	0.29
Uniform Delay, d1	38.2	38.1	29.0	45.2	44.7		45.3	28.5		45.5	31.2	10.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.98	1.38	6.26
Incremental Delay, d2	11.0	10.7	0.3	0.7	0.2		15.9	7.3		3.5	16.2	0.0
Delay (s)	49.2	48.9	29.3	45.9	44.9		61.2	35.9		48.1	59.2	62.6
Level of Service	D	D	C	D	D		E	D		D	E	E
Approach Delay (s)			41.4		45.1			39.1			59.5	
Approach LOS			D		D			D			E	
Intersection Summary												
HCM 2000 Control Delay	48.6		HCM 2000 Level of Service		D							
HCM 2000 Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	102.0		Sum of lost time (s)		24.0							
Intersection Capacity Utilization	80.6%		ICU Level of Service		D							
Analysis Period (min)	15											

c = Critical Lane Group

APPENDIX H

QUEUE STORAGE ANALYSIS

Queues

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	258	633	254	161	197	1396	437	167	1809	124
v/c Ratio	0.56	0.73	0.85	0.58	0.27	0.98	0.59	0.36	0.83	0.76	0.15
Control Delay	63.8	48.3	56.3	45.3	4.2	106.5	9.7	0.8	88.1	30.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.8	48.3	56.3	45.3	4.2	106.5	9.7	0.8	88.1	30.4	3.6
Queue Length 50th (ft)	48	70	244	175	4	84	107	0	67	413	0
Queue Length 95th (ft)	79	112	291	241	36	#163	305	0	#128	#594	33
Internal Link Dist (ft)		230		920			575			920	
Turn Bay Length (ft)			265		265	235		210	210		150
Base Capacity (vph)	686	599	828	445	607	200	2372	1214	200	2372	811
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.43	0.76	0.57	0.27	0.98	0.59	0.36	0.83	0.76	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

6: Scottsdale Rd & 6750 North

08/06/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	82	74	157	1883	2385	121
v/c Ratio	0.39	0.13	0.39	0.43	0.66	0.11
Control Delay	59.3	34.0	64.7	3.5	13.6	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	34.0	64.7	3.5	13.6	6.6
Queue Length 50th (ft)	31	23	62	142	288	19
Queue Length 95th (ft)	57	46	m90	176	457	m52
Internal Link Dist (ft)	530			305	370	
Turn Bay Length (ft)	300	50	100			150
Base Capacity (vph)	600	587	400	4412	3598	1140
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.39	0.43	0.66	0.11

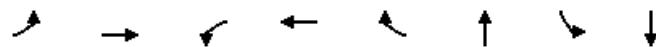
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

10: Quail Run Road & Lincoln Dr

08/06/2020



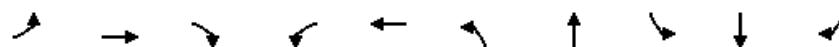
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	280	1179	5	1280	7	10	9	157
v/c Ratio	0.65	0.39	0.02	0.51	0.01	0.10	0.12	0.50
Control Delay	11.6	2.7	7.6	10.1	0.0	2.0	61.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	2.7	7.6	10.1	0.0	2.0	61.5	5.9
Queue Length 50th (ft)	25	87	1	227	0	0	7	0
Queue Length 95th (ft)	92	113	7	354	0	0	26	0
Internal Link Dist (ft)		560		1280		320		320
Turn Bay Length (ft)	100		100		100			
Base Capacity (vph)	470	2999	317	2511	1140	200	290	518
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.39	0.02	0.51	0.01	0.05	0.03	0.30

Intersection Summary

Queues

11: Scottsdale Rd & Lincoln Dr

08/06/2020



Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	343	343	428	27	94	318	1525	40	1967	661
v/c Ratio	0.83	0.82	0.64	0.28	0.41	1.01	0.68	0.30	0.95	0.54
Control Delay	61.4	60.5	20.2	61.3	29.6	108.1	29.5	61.6	56.1	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	60.5	20.2	61.3	29.6	108.1	29.5	61.6	56.1	11.9
Queue Length 50th (ft)	265	265	130	21	14	~130	354	26	571	151
Queue Length 95th (ft)	#454	#451	217	51	41	#227	411	m45	#661	444
Internal Link Dist (ft)	1280				375		1240		865	
Turn Bay Length (ft)	180			100		275		185		165
Base Capacity (vph)	413	417	671	177	373	314	2232	147	2076	1227
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.82	0.64	0.15	0.25	1.01	0.68	0.27	0.95	0.54

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Queues

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	261	427	490	328	143	311	2042	541	198	1766	201
v/c Ratio	0.72	0.82	0.67	0.71	0.25	1.82	0.95	0.48	1.16	0.82	0.27
Control Delay	63.6	56.4	49.0	51.1	8.2	416.0	29.1	3.5	167.3	35.1	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	56.4	49.0	51.1	8.2	416.0	29.1	3.5	167.3	35.1	9.2
Queue Length 50th (ft)	102	149	181	234	21	~191	449	41	~93	434	30
Queue Length 95th (ft)	142	197	243	341	52	#287	#704	103	#172	530	85
Internal Link Dist (ft)		230		920			575			920	
Turn Bay Length (ft)			265		265	235		210	210		150
Base Capacity (vph)	743	691	726	460	571	171	2151	1120	171	2151	747
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.62	0.67	0.71	0.25	1.82	0.95	0.48	1.16	0.82	0.27

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.

Queues

6: Scottsdale Rd & 6750 North

08/06/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	173	226	174	2691	2498	47
v/c Ratio	0.58	0.27	0.30	0.65	0.80	0.05
Control Delay	60.4	31.7	54.4	9.4	27.3	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	31.7	54.4	9.4	27.3	12.7
Queue Length 50th (ft)	67	74	60	665	472	12
Queue Length 95th (ft)	102	106	m67	m716	596	m24
Internal Link Dist (ft)	550			305	370	
Turn Bay Length (ft)	300	50	100			150
Base Capacity (vph)	514	847	572	4135	3118	980
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.27	0.30	0.65	0.80	0.05

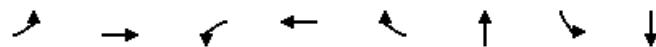
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

10: Quail Run Road & Lincoln Dr

08/06/2020



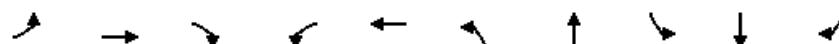
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	255	602	5	1017	10	10	7	264
v/c Ratio	0.53	0.20	0.01	0.39	0.01	0.10	0.07	0.72
Control Delay	5.9	2.5	6.2	7.4	0.0	2.1	55.8	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	2.5	6.2	7.4	0.0	2.1	55.8	17.4
Queue Length 50th (ft)	23	35	1	134	0	0	6	0
Queue Length 95th (ft)	59	73	6	237	0	0	21	74
Internal Link Dist (ft)		290		1550		320		320
Turn Bay Length (ft)	100		100		100			
Base Capacity (vph)	555	2951	581	2604	1180	169	290	546
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.20	0.01	0.39	0.01	0.06	0.02	0.48

Intersection Summary

Queues

11: Scottsdale Rd & Lincoln Dr

08/06/2020



Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	342	343	423	47	141	386	2169	80	2024	477
v/c Ratio	0.91	0.90	0.59	0.42	0.50	0.82	0.97	0.54	1.06	0.42
Control Delay	75.1	74.0	14.7	64.1	30.7	65.3	46.2	83.0	73.6	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	74.0	14.7	64.1	30.7	65.3	46.2	83.0	73.6	4.1
Queue Length 50th (ft)	274	274	109	36	24	151	~613	66	~652	83
Queue Length 95th (ft)	#525	#524	186	74	56	202	#740	m85	#750	m139
Internal Link Dist (ft)	1550				375		1240		865	
Turn Bay Length (ft)	180			100		275		185		165
Base Capacity (vph)	376	380	745	221	474	543	2241	191	1906	1143
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.90	0.57	0.21	0.30	0.71	0.97	0.42	1.06	0.42

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Queues

4: Scottsdale Rd & Indian Bend Rd.

08/06/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	247	434	545	322	278	313	1558	571	233	1639	210
v/c Ratio	0.68	0.83	0.80	0.77	0.52	1.86	0.74	0.52	1.39	0.78	0.28
Control Delay	53.5	47.4	49.1	51.1	20.5	439.7	29.4	9.9	244.1	29.4	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	47.4	49.1	51.1	20.5	439.7	29.4	9.9	244.1	29.4	8.4
Queue Length 50th (ft)	80	113	172	192	72	~163	323	155	~104	342	28
Queue Length 95th (ft)	118	165	#252	#339	139	#251	384	279	#182	408	78
Internal Link Dist (ft)		230		920			575			920	
Turn Bay Length (ft)			265		265	235		210	210		150
Base Capacity (vph)	605	605	689	417	531	168	2112	1085	168	2112	740
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.72	0.79	0.77	0.52	1.86	0.74	0.53	1.39	0.78	0.28

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.

Queues

6: Scottsdale Rd & 6750 North

08/06/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	124	212	215	2293	2308	49
v/c Ratio	0.46	0.28	0.46	0.56	0.75	0.05
Control Delay	50.3	28.7	33.8	0.8	15.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	28.7	33.8	0.8	15.4	4.0
Queue Length 50th (ft)	40	59	76	12	340	3
Queue Length 95th (ft)	69	91	m91	20	423	m16
Internal Link Dist (ft)	550			305	370	
Turn Bay Length (ft)	300	50	100			150
Base Capacity (vph)	336	769	471	4089	3092	976
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.28	0.46	0.56	0.75	0.05

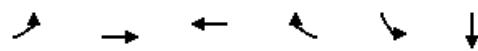
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues

10: Quail Run Road & Lincoln Dr

08/06/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	343	18	26	10	8	295
v/c Ratio	0.57	0.01	0.02	0.02	0.02	0.25
Control Delay	12.1	6.1	10.9	0.0	11.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	6.1	10.9	0.0	11.0	0.5
Queue Length 50th (ft)	53	1	2	0	2	0
Queue Length 95th (ft)	99	4	8	0	8	0
Internal Link Dist (ft)		560	1280			320
Turn Bay Length (ft)	100			150		
Base Capacity (vph)	607	1769	1179	603	470	1200
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.01	0.02	0.02	0.02	0.25
Intersection Summary						

Queues

11: Scottsdale Rd & Lincoln Dr

08/06/2020



Lane Group	EBL	EBT	EBC	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	282	284	358	46	132	275	1861	83	1962	477
v/c Ratio	0.80	0.79	0.57	0.37	0.43	0.91	0.89	0.54	0.98	0.40
Control Delay	56.0	55.4	13.8	52.7	20.4	80.4	36.2	52.7	54.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	55.4	13.8	52.7	20.4	80.4	36.2	52.7	54.2	9.0
Queue Length 50th (ft)	178	180	65	29	12	93	~450	45	~430	100
Queue Length 95th (ft)	#326	#327	128	64	41	#169	#567	m67	#590	245
Internal Link Dist (ft)	1280				375		1240			865
Turn Bay Length (ft)	180			100		275		185		165
Base Capacity (vph)	359	364	628	208	454	302	2091	173	2009	1179
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.78	0.57	0.22	0.29	0.91	0.89	0.48	0.98	0.40

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

APPENDIX I

SIGHT DISTANCE ANALYSIS

Palmerae - Scottsdale Road

Sight Distance Analysis

Assumptions and/or Givens

Elements of Design from AASHTO 2004

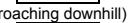
		AASHTO Ref
Driver Eye Height		
Passenger Vehicle	3.50 ft	p 127
Truck	7.60 ft	p 127
Object Height		
Stopping Sight Distance	2.00 ft	p 127
Passing Sight Distance	3.50 ft	p 127
Vehicle Height	4.25 ft	p 127
Driver Eye Location		
From Edge of Major Rd Traveled Way	14.50 ft	p 657
Deceleration Rate (a)		
Passenger Vehicle	11.20 ft/sec ²	p 111
Truck	N/A ft	
Brake reaction time (t)	2.50 sec	p 113

Site Specific Data

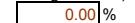
Major Street Design Speed (V_{major})

 MPH

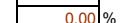
Grades - Approaching Minor Street from: (- = approaching downhill)

 %

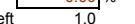
Left (G_L)

 %

Right (G_R)

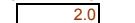
 %

Approach Grade Adjustment Factor

 1.0

Left Right p 658

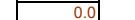
Major Road Through Lanes on Each Approach

 2.0

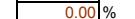
Median Width (in "Lane Equivalents")

 1.2

Bicycle Lane Width (in "Lane Equivalents")

 0.0

Minor Road Approach Upgrade, if >3%

 %

Minor Road Access (check restricted)



LI LO/Th RO

Stopping Sight Distance = Brake Reaction Distance + Braking Distance

Negelecting Effect of Grade

$$d=1.47Vt+1.075 \frac{V^2}{a}$$

p 113

Calculated d= 423.8 ft
Design d= 425 ft

With Effect of Grade

$$d=1.47Vt+\frac{V^2}{30((\frac{a}{32.2})\pm G)}$$

p 114

Calculated d= 423.6 ft - left
425 ft - right
Design d= 423.6 ft - left
425 ft - right

SSD's do not consider design for truck operations, since better visibility is considered to offset longer braking distance.

p 114

Palmerae - Scottsdale Road

Sight Distance Analysis

Intersection Sight Distances

Case B—Intersections with Stop Control on the Minor Road

AASHTO Ref
p 657

Case B1—Left Turn from the Minor Road

pp 657ff

Design Vehicle

	Time Gap (t_g)	
Passenger Car	7.5 sec	p 660
Single-Unit Tuck	9.5 sec	p 660
Combination Truck	11.5 sec	p 660

Time gap adjustments

Add'l lanes to cross (1 st is assumed)		
Passenger Car	0.5 sec	p 660
Trucks	0.7 sec	p 660
Minor Approach Upgrade (Per each 1%>3%)	0.2 sec	p 660

Site data

Major Road + Bike Lanes on Left Approach	2.0	p 660
Minor Road Approach Upgrade, if >3%	0 %	p 660

Time Gap based on site data

Design Vehicle Gap+Adj for Approach Grade>3%+Adj's for Add'l Lanes & Median		
Passenger Car	8.6 sec	
Single-Unit Tuck	11.0 sec	
Combination Truck	13.0 sec	

ISD to left & right along Major Road ISD=1.47 $V_{major}t_g$ (ft) p 659

		ISD to Left and Right
Passenger Car	calculated ISD=	$\frac{632.1 \text{ ft}}{635 \text{ ft}}$
Single-Unit Tuck	calculated ISD=	$\frac{811.4 \text{ ft}}{815 \text{ ft}}$
Combination Truck	calculated ISD=	$\frac{958.4 \text{ ft}}{960 \text{ ft}}$

Palmerae - Scottsdale Road
Sight Distance Analysis
Intersection Sight Distances (cont'd)

Case B2—Right Turn from the Minor Road
&
Case B3—Crossing Maneuver from the Minor Road

AASHTO Ref
p 663
pp 663ff

Design Vehicle

Time Gap (t_g)

Passenger Car	6.5 sec	p 664
Single-Unit Tuck	8.5 sec	p 664
Combination Truck	10.5 sec	p 664

Time gap adjustments - Case B-3 Only*

Add'l lanes to cross (1 st is assumed) Passenger Car	0.5 sec	p 664
Trucks	0.7 sec	p 664
Minor Approach Upgrade (Per each 1%>3%)	0.1 sec	p 664

Site data

Major Road + Bike Lanes on Left Approach	2.0	p 664
Minor Road Approach Upgrade, if >3%	0 %	p 664

Time Gap based on site data (sec)

	B2 & B3	B3 Only
<i>Design Vehicle Gap+Adj for Approach Grade>3% (+Adj's for Add'l Lanes & Median for B3)</i>		
Passenger Car	7.6	8.1
Single-Unit Tuck	10.0	10.7
Combination Truck	12.0	12.7

ISD to left (B2/B3) & right (B3) along Major Rd ISD= $1.47V_{\text{major}}t_g$ (ft) p 659

		ISD to Left	ISD to right
		(B2 & B3)	(B3 Only)
Passenger Car	calculated ISD=	558.6	595.4
	design ISD=	560	600
Single-Unit Tuck	calculated ISD=	737.9	789.4
	design ISD=	740	790
Combination Truck	calculated ISD=	884.9	936.4
	design ISD=	885	940

*Number of major road lanes is irrelevant in Case B2.

The differences between Case B1 and Cases B2 & B3 are reduced time gaps and time gap adjustment for the minor approach upgrade. p 663

Palmerae - Scottsdale Road
Sight Distance Analysis
Intersection Sight Distances (cont'd)

Case F—Left Turns from the Major Road

AASHTO Ref
pp 674ff

Design Vehicle

Passenger Car	5.5 sec	p 674
Single-Unit Tuck	6.5 sec	p 674
Combination Truck	7.5 sec	p 674

Time gap adjustments

Add'l lanes to cross (1 assumed) Passenger Car	0.5 sec	p 674
Trucks	0.7 sec	p 674

Site data

Opposing Lanes (adj'd for x-wide median)

2.2

Time Gap based on site data

<i>Design Vehicle Gap+Adj for Add'l Opposing Lanes</i>	6.6 sec
Passenger Car	8.0 sec
Single-Unit Tuck	9.0 sec

ISD to front along Major Road	ISD= $1.47V_{\text{major}}t_g$ (ft)		
Passenger Car	calculated ISD= 485.1 ft	design ISD= 490 ft	p 659
Single-Unit Tuck	calculated ISD= 590.9 ft	design ISD= 595 ft	
Combination Truck	calculated ISD= 664.4 ft	design ISD= 665 ft	

The differences between Case F and Cases B1, B2 & B3 are reduced time gaps and no time gap adjustment for any minor approach upgrade.

p 663

SIGHT DISTANCE SUMMARY

Governing Case	Car	SU Truck	Combo Truck
Stopping			
Without effect of grade		425	N/A
With effect of grade on left		425	N/A
With effect of grade on right		425	N/A
Intersection			
To Right	B1	635	815
To Left	B2/B3	560	740
On Major Road	F	490	595
			665

Palmerae - Indian Bend Road

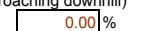
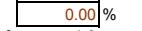
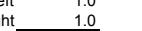
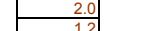
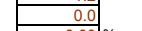
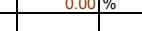
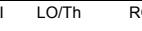
Sight Distance Analysis

Assumptions and/or Givens

Elements of Design from AASHTO 2004

		AASHTO Ref
Driver Eye Height		
Passenger Vehicle	3.50 ft	p 127
Truck	7.60 ft	p 127
Object Height		
Stopping Sight Distance	2.00 ft	p 127
Passing Sight Distance	3.50 ft	p 127
Vehicle Height	4.25 ft	p 127
Driver Eye Location		
From Edge of Major Rd Traveled Way	14.50 ft	p 657
Deceleration Rate (a)		
Passenger Vehicle	11.20 ft/sec ²	p 111
Truck	N/A ft	
Brake reaction time (t)	2.50 sec	p 113

Site Specific Data

Major Street Design Speed (V _{major})	 MPH				
Grades - Approaching Minor Street from: (- = approaching downhill)					
Left (G _L)	 %				
Right (G _R)	 %				
Approach Grade Adjustment Factor	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Left</td><td>1.0</td> </tr> <tr> <td>Right</td><td>1.0</td> </tr> </table>	Left	1.0	Right	1.0
Left	1.0				
Right	1.0				
Major Road Through Lanes on Each Approach	 %				
Median Width (in "Lane Equivalents")	 %				
Bicycle Lane Width (in "Lane Equivalents")	 %				
Minor Road Approach Upgrade, if >3%	 %				
Minor Road Access (check restricted)	 LI LO/Th RO				

Stopping Sight Distance = Brake Reaction Distance + Braking Distance

Nelecting Effect of Grade

$$d=1.47Vt+1.075 \frac{V^2}{a}$$

p 113

$$\begin{aligned} \text{Calculated } d &= 246.2 \text{ ft} \\ \text{Design } d &= 250 \text{ ft} \end{aligned}$$

With Effect of Grade

$$d=1.47Vt+\frac{V^2}{30\left(\frac{a}{32.2}\right)\pm G}$$

p 114

$$\begin{aligned} \text{Calculated } d &= 246.4 \text{ ft - left} \\ &\quad 250 \text{ ft - right} \\ \text{Design } d &= 246.4 \text{ ft - left} \\ &\quad 250 \text{ ft - right} \end{aligned}$$

SSD's do not consider design for truck operations, since better visibility is considered to offset longer braking distance.

p 114

Palmerae - Indian Bend Road

Sight Distance Analysis

Intersection Sight Distances

Case B—Intersections with Stop Control on the Minor Road

AASHTO Ref
p 657

Case B1—Left Turn from the Minor Road

pp 657ff

Design Vehicle	Time Gap (t _g)	
Passenger Car	7.5 sec	p 660
Single-Unit Truck	9.5 sec	p 660
Combination Truck	11.5 sec	p 660
Time gap adjustments		
Add'l lanes to cross (1 st is assumed)		
Passenger Car	0.5 sec	p 660
Trucks	0.7 sec	p 660
Minor Approach Upgrade (Per each 1%>3%)	0.2 sec	p 660

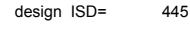
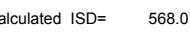
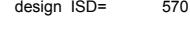
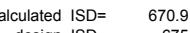
Site data

Major Road + Bike Lanes on Left Approach	2.0	p 660
Minor Road Approach Upgrade, if >3%	0 %	p 660

Time Gap based on site data

Design Vehicle Gap+Adj for Approach Grade>3%+Adj's for Add'l Lanes & Median		
Passenger Car	8.6 sec	
Single-Unit Truck	11.0 sec	
Combination Truck	13.0 sec	

$$\text{ISD to left & right along Major Road} \quad \text{ISD}=1.47V_{\text{major}}t_g \quad (\text{ft}) \quad \text{p 659}$$

		ISD to Left and Right
Passenger Car	calculated ISD=	 ft
	design ISD=	 ft
Single-Unit Truck	calculated ISD=	 ft
	design ISD=	 ft
Combination Truck	calculated ISD=	 ft
	design ISD=	 ft

Palmerae - Indian Bend Road
Sight Distance Analysis
Intersection Sight Distances (cont'd)

Case B2—Right Turn from the Minor Road
&
Case B3—Crossing Maneuver from the Minor Road

AASHTO Ref
p 663

Design Vehicle

Time Gap (t_g)

Passenger Car	6.5 sec	p 664
Single-Unit Tuck	8.5 sec	p 664
Combination Truck	10.5 sec	p 664

Time gap adjustments - Case B-3 Only*

Add'l lanes to cross (1 st is assumed)		
Passenger Car	0.5 sec	p 664
Trucks	0.7 sec	p 664
Minor Approach Upgrade (Per each 1%>3%)	0.1 sec	p 664

Site data

Major Road + Bike Lanes on Left Approach	2.0	p 664
Minor Road Approach Upgrade, if >3%	0 %	p 664

Time Gap based on site data (sec)

	B2 & B3	B3 Only
<i>Design Vehicle Gap+Adj for Approach Grade>3% (+Adj's for Add'l Lanes & Median for B3)</i>		
Passenger Car	7.6	8.1
Single-Unit Tuck	10.0	10.7
Combination Truck	12.0	12.7

ISD to left (B2/B3) & right (B3) along Major Rd ISD= $1.47V_{\text{major}}t_g$ (ft) p 659

		ISD to Left	ISD to right
		(B2 & B3)	(B3 Only)
Passenger Car	calculated ISD=	391.0	416.7
	design ISD=	395	420
Single-Unit Tuck	calculated ISD=	516.6	552.6
	design ISD=	520	555
Combination Truck	calculated ISD=	619.5	655.5
	design ISD=	620	660

*Number of major road lanes is irrelevant in Case B2.

The differences between Case B1 and Cases B2 & B3 are reduced time gaps and time gap adjustment for the minor approach upgrade. p 663

Palmerae - Indian Bend Road
Sight Distance Analysis
Intersection Sight Distances (cont'd)

Case F—Left Turns from the Major Road

AASHTO Ref
pp 674ff

Design Vehicle

Design Vehicle	Time Gap (t_g)	
Passenger Car	5.5 sec	p 674
Single-Unit Tuck	6.5 sec	p 674
Combination Truck	7.5 sec	p 674

Time gap adjustments

Add'l lanes to cross (1 assumed)	
Passenger Car	0.5 sec
Trucks	0.7 sec

	Time Gap (t_g)	
Passenger Car	0.5 sec	p 674
Trucks	0.7 sec	p 674

Site data

Opposing Lanes (adj'd for x-wide median)

2.2

Time Gap based on site data

	Design Vehicle Gap+Adj for Add'l Opposing Lanes	
Passenger Car	6.6 sec	
Single-Unit Tuck	8.0 sec	
Combination Truck	9.0 sec	

ISD to front along Major Road

	ISD= $1.47V_{\text{major}}t_g$ (ft)		
Passenger Car	calculated ISD=	339.6 ft	p 659
	design ISD=	340 ft	
Single-Unit Tuck	calculated ISD=	413.7 ft	
	design ISD=	415 ft	
Combination Truck	calculated ISD=	465.1 ft	
	design ISD=	470 ft	

The differences between Case F and Cases B1, B2 & B3 are reduced time gaps and no time gap adjustment for any minor approach upgrade.

p 663

SIGHT DISTANCE SUMMARY

Governing Case	Car	SU Truck	Combo Truck
Stopping			
Without effect of grade		250	N/A
With effect of grade on left		250	N/A
With effect of grade on right		250	N/A
Intersection			
To Right	B1	445	570
To Left	B2/B3	395	520
On Major Road	F	340	415